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# BROADCASTING HEALTH

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Everybody Liked Chew-Chew Inn

*The Story Series in Health*

# BROADCASTING HEALTH

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FOR ORAL HYGIENE



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## FOR THE TEACHER TO READ

Since "Broadcasting Health" is a pioneer among the textbooks now available for children in the elementary school, it seems especially desirable that teachers should know some of the reasons that called it into being and the point of view of its authors.

Intimate contact over a period of years with the problems of health-teaching in schools has led to the belief that there is need of a single book which will offer to pupils in the grades an elementary survey of the field of nutrition, with special suggestions on training in wholesome attitudes toward food and in food habits. Problems of nutrition are now in the foreground. Courses of study, reports of health meetings, manuscripts submitted to magazines for publication, health articles in newspapers,—all indicate that there is more interest on the part of the general public, as well as on the part of health educators, in this aspect of hygiene than in any other. A recent investigation in a large school system also shows that teachers keenly feel the need of help in giving instruction and training in nutrition. The school principals of such a system were asked at a health conference to list the health problems in their schools in which they needed help. It is significant that 100 per cent of the principals had "food and nutrition" on the list.

It is evident, further, that the great mass of boys and girls below the high school are much more superficially informed on the subject of foods than they are on such subjects as history or arithmetic. Some of the girls, it is true, have courses in domestic science, but in general that number is limited to a small proportion. The boys fail altogether to get that training. The majority of boys and girls get their ideas about food from the regular courses in hygiene. The textbooks used, since they must cover a good deal of ground, usually can devote only a small amount of space to nutrition. In most of our high schools only a small proportion of the students get anything really substantial on nutrition. When one considers that the problem of foods is one of the major problems of society as well as of everyday living, and that a large number of our pupils never reach the high school or even the eighth grade, one quickly sees the need of vital education in nutrition at an early stage in school life. It is evident also that this need cannot be satisfied in less than a year of concentrated study. The wealth of picturesque material which heretofore has not found its way into textbooks for children makes the project of satisfying this need an alluring one. It was in the study of these matters that the idea of the book was born.

The scope and the character of the presentation were yet to be determined. In order that the teacher may get an insight into the general plan of this volume and the reasons that lie behind its organization, the



authors invite you to consider these points that have been kept in mind in the preparation of the book:

1. *Content.* The material introduced into the text includes in an elementary way the whole subject of foods in relation to health and civilization. Effort has been made to make the text readable and comprehensible to boys and girls in the upper grades, but certain terms often regarded as technical, though found currently in newspapers, magazines, and even in a good deal of conversation, are used freely. There are many good reasons why pupils should understand and become familiar with such words as *calories*, *vitamin A*, *protein*, *carbohydrate*, *iodine*, *pasteurized*, and the like. Many of these terms are now in common use; and since they have been developed to express a certain definite meaning, no other expression is quite so satisfactory. Loose terms such as *appetizers*, *growth builders*, and so on for *vitamins*, used by some writers for children, are not only inadequate but inexact and misleading. The authors of "Broadcasting Health" have found to their satisfaction not only that children can learn and comprehend the more technical terms but that they take genuine enjoyment in doing so. The generous glossary at the end will help both teachers and pupils to deal with any of the word difficulties. The vocabulary has been carefully checked also by the Buckingham-Dolch Word List.

2. *Method of Presentation.* The story form has been used because it has been found by experience that pupils in the upper grades prefer the story form to the

more formal method. Such a method makes it possible to portray a modern school in action. All the activities presented have actually been carried out successfully in school practice, — activities such as cleaning up and beautifying a lunch room, broadcasting, playing cafeteria, taking field trips, showing photographic slides by means of a school lantern, learning how to choose foods in the school cafeteria, performing experiments, working out problems, engaging in individual and group projects, getting out a health number of the school paper, and coöperating with the home.

When the story in manuscript form was tried out with children, it was found to have unusual power of suggestion. The pupils were eager to do the things that the boys and girls did in the Work Together Room under the supervision of Miss Leader. "The Health Bulletin Board," at the end of each chapter, aroused the children's interest. The exercises are so informal and have proved so challenging that the children have found interest not only in doing the many things suggested but in having their own bulletin board and their own notebooks. It is hoped by the authors that these features will be adopted by every class that uses the book.

*The plan to challenge the attention of pupils so as to stimulate them to acquire knowledge and to think and to do runs throughout the entire book.* In the body of the text are questions that demand an answer, and nearly every illustration and map is followed by questions that require further reading of the text and whet the curiosity of the pupil. Teachers will appre-

ciate the new factual material on foods, and the many correlations of the text with geography, history, and general science.

Although "Broadcasting Health" is in story form, unusual care has been taken to insure the scientific accuracy of the text. Its purpose is not only to give pupils a broad knowledge of nutrition but to suggest ways in which they may train themselves in choosing and eating the right kinds of food.

The authors are deeply grateful to the many students of nutrition and to classroom teachers who have contributed directly and indirectly to "Broadcasting Health." They wish to thank particularly Dr. J. F. Rodgers, consultant in hygiene, Office of Education, Department of the Interior, Washington, D. C., for much material (which appeared in *School Life*) in the chapter "Learning from the Wild Animals of the Zoo"; also the Metropolitan Life Insurance Company for the suggestions on the fuel value of milk, on page 160; and the National Dairy Council for much of the material found in Chapter XXV, on the "A" lunch. Special thanks are due to the school paper of the Banning Grammar School, Banning, California, for the advertisements reproduced in the last chapter. Acknowledgment is also made for use of several photographs of the United States Bureau of Plant Industry.

May this volume please both teachers and children and help to broadcast health wherever it may journey!

J. MACE ANDRESS  
I. H. GOLDBERGER





## CONTENTS

CHAPTER	PAGE
I. <i>Chew-Chew Inn</i> . . . . .	1
II. <i>Why We Need Food — The First Broadcast</i> . . .	13
III. <i>What Makes You Go</i> . . . . .	27
IV. <i>Foods That Furnish Go-Material</i> . . . . .	41
V. <i>Foods That Furnish Grow-Material</i> . . . . .	52
VI. <i>Water and Air for Good Health</i> . . . . .	59
VII. <i>The Body Needs Minerals</i> . . . . .	72
VIII. <i>A Salad a Day</i> . . . . .	82
IX. <i>Solving a Mystery</i> . . . . .	89
X. <i>Two Health Heroes</i> . . . . .	96
XI. <i>Fresh Raw Food is Necessary</i> . . . . .	104
XII. <i>The Up-and-Coming Vitamin</i> . . . . .	113
XIII. <i>A Healthy Mouth</i> . . . . .	126
XIV. <i>How Food is Changed into Ourselves</i> . . . . .	143
XV. <i>The Story of Milk</i> . . . . .	154
XVI. <i>The Story of Grain</i> . . . . .	168
XVII. <i>The Story of Vegetables</i> . . . . .	181
XVIII. <i>The Story of Fruit</i> . . . . .	196
XIX. <i>The Story of Nuts</i> . . . . .	212
XX. <i>The Story of Meat, Fish, and Eggs</i> . . . . .	221
XXI. <i>A Debate: Which is Better for Health, Candy or Fruit?</i> . . . . .	233
XXII. <i>Jack and Jill</i> . . . . .	243
XXIII. <i>Are Alcohol, Tobacco, and Drugs Good Friends?</i> .	249
XXIV. <i>Are Coffee, Tea, Salt, and Pepper Good Friends?</i> .	261
XXV. <i>Can You Order an "A" Lunch?</i> . . . . .	267
XXVI. <i>The Preservation of Food, or Keeping Food from Decay</i>	280

CHAPTER	PAGE
XXVII. <i>The Story of Cooking</i> . . . . .	294
XXVIII. <i>Fighting Insect Enemies</i> . . . . .	306
XXIX. <i>How Plants Help</i> . . . . .	324
XXX. <i>How the Government Helps</i> . . . . .	334
XXXI. <i>Learning from the Wild Animals at the Zoo</i> . .	342
XXXII. <i>With Admiral Byrd at the South Pole</i> . . . . .	354
XXXIII. <i>The Health News</i> . . . . .	364
APPENDIX	
<i>Suggestions to the Teacher on Weighing and Measuring</i>	373
GLOSSARY . . . . .	375
INDEX . . . . .	393



# BROADCASTING HEALTH

## I

### *Chew-Chew Inn*

IT WAS luncheon time at Chew-Chew Inn. The big bell had sounded, and the boys and girls of the Abraham Lincoln School were streaming through the wide doors of the Inn.

The boys and girls were proud of Chew-Chew Inn. They had worked hard to make it one of the prettiest and neatest school cafeterias in the city. It had not always been so pretty as it was now. At one time the lunch room was the gloomiest part of the building. It was not always so clean as it might have been. Often mice squealed and scampered around, frightening the girls. Most of the children chose to bring their lunches from home rather than buy them in the lunch room. They did not like the food; often they were afraid they might get sick if they ate it.

Finally there was a meeting of both pupils and teachers in the assembly hall. They came together to talk about the lunch room. All agreed that good manners and good health called for a lunch room that was clean, pretty, and comfortable, so that they might

enjoy eating their lunches there. It was even hinted that better food might be served.

The new principal of the Abraham Lincoln School was Miss Wise. She talked with the men and women on the school board about the lunch room. The board was willing to give one hundred dollars for its improvement. This was good news.

Both the teachers and the pupils planned to work hard. Various committees were formed. On Saturdays and after school they worked with all their might. The floor was scraped, polished, and waxed. Screens were put up at the doors and windows. The girls in sewing classes made some dainty draperies of flowered orange material for the windows. The tables were painted green. Instead of a few large, long tables there were now many small ones. The lunch counter was given a glossy ivory-colored surface. The gas range was scoured and polished. The cafeteria was going to be a wonderful place. But when Miss Wise and the furnishings committee looked at the old heavy white dishes, they were discouraged.

"Go on and buy what you want to make our tables look pretty," said Miss Wise. "We shall find the money somehow. Send the bill to me."

So the committee bought plates and cups and saucers that had blue-and-orange designs on them. They found drinking glasses of green and yellow.

One day Mr. Winooski of the Art Department of the high school came in and made an offer which was eagerly accepted. He said his pupils would be glad to

paint some colored pictures on the pale, dull walls. How those pictures did brighten up the room! One was a harvest scene showing farmers gathering the golden grain. Another showed fishermen out on the blue ocean pulling in their nets. Still another showed an orange grove. The trees were heavily laden with round, golden fruit. In the distance were mountains covered with snow. One of the most appealing of these wall pictures was that of a happy family — father, mother, and children — sitting at the breakfast table.

The lunch room was getting to be such a pretty place that one day somebody said: "I am just sick and tired of hearing this beautiful place called the 'lunch room' or the 'cafeteria.' Let's have a real name with some fun in it." A prize was offered to the pupil who thought up the best name. Over a hundred names were offered, such as "Pickwick Tavern," "Dew Drop Inn," "The Jolly Jack," and "Chew-Chew Inn." It was hard for the judges to decide which name was the best, because there were so many good ones. The name that they thought about longest was "Chew-Chew Inn."

"Isn't 'Chew-Chew' slangy?" asked one.

"I don't think so," said another. "It isn't like any other name I ever heard, but I'm sure Chew is a good English word."

"I like it," said another. "Our books on health tell us that we should take plenty of time to chew our food. Perhaps if we call our lunch room 'Chew-Chew Inn,' we'll remember to do it."

"That's so," added another. "And I should think 'Chew-Chew Inn' would be a good name because it will seem funny to the boys and girls. They will like it."

So "Chew-Chew Inn" it became.

One of the art classes planned and painted a sign to be hung just outside the door of the Inn. It was



*This jolly fellow invites the boys and girls in to have something good to eat and drink*

a picture of a good-natured fellow holding a glass of milk in one hand and a lettuce sandwich in the other. Beneath it were the words "Chew-Chew Inn."

You may wonder how the children got the money to do all these things. As you know, the teachers, boys, and girls did nearly all the work. Then, when the children went home and told their parents about the plan for the Inn,

they found them willing to help as much as they could with money and materials. When the merchants near by heard about it, they too found that they could spare money, paint, polish, and other materials to help the plan along. When the Inn was completed, the boys and girls gave a health play one evening in the assembly hall. The school orchestra played. The chil-



dren had worked hard to sell tickets, and the hall was full. After the entertainment the guests were invited down to the Chew-Chew Inn, where they could buy ice cream, cake, and sandwiches. When the children counted up all the money that had come in for the play and the refreshments, they found that they were out of debt.

You are not surprised, then, that the Abraham Lincoln School and the neighborhood as well were proud of Chew-Chew Inn. They had all helped to make it. The children could scarcely wait for the sound of the bell which told them that the luncheon hour had come. The jolly fellow on the sign had a good message for them now. How happy they were, eating in their beautiful Inn! It seemed almost like one of the famous old inns of a foreign land.

In one corner of the big dining room there was a long table at which forty or more people might be seated. On different days different classes had this table. Today the table was being used by Miss Leader and her pupils.

"O Miss Leader," asked Dorothy, "what are we going to study this year about health?"

"We shall spend the whole year on foods," replied Miss Leader.

"That will be interesting," said Frank. "I have often thought of questions about food that I could not answer." He looked at the shiny roll before him. "Wouldn't it be fun to find out how people have made flour in the past! I have heard that some

kinds of bread are better than other kinds. I think we ought to know."

"Is this cinnamon on this crust?" asked Mary. "I wonder whether cinnamon is good for our health. Will our health work this year help us to answer questions like these?"

"Yes," said Miss Leader. "I think you might like to know now that spices played a very important part in history. 'Way back in the time of Columbus there were no electric refrigerators or any other kind of ice box. People used spices to preserve foods. Since spices were found in the Far East, in China and Japan, buying and selling in those countries made many merchants very rich. For a long time this business passed through Constantinople. Camels brought the spices from the Far East through Asia Minor. From Constantinople the spices were taken on board ships, usually Italian ships, to Italian seaports. There they were distributed to all Europe. In 1453 Constantinople was captured by the Turks. It became much more difficult to secure spices.

"Columbus found his native city of Genoa becoming very poor and her great ships falling into decay because of the loss of business. So Columbus and many of the brave sailors and merchants of his day became interested in finding a new route to the Indies. Finally, as you know, Columbus was able to get King Ferdinand and Queen Isabella of Spain to help him make ready three ships, and he set out on a voyage of discovery. Believing that the earth was round, he





*Talking things over*

"What are we going to study this year about health?"



### *Ships of Columbus*

The bold sailors who turned their ships westward on the storm-tossed Atlantic hoped to reach the far-away East, where they could secure spice. Why did they want spice? What do we use it for today? Is it a food? Is it good for children? Some of these questions are not answered in this chapter, but you will find the answers later in the book

sailed west instead of east, expecting to reach the Indies if he traveled far enough in that direction. Even up to the time of his death he still believed that the new lands he had discovered were a part of Asia.

"As to the use of spice in our food today, perhaps we had better discuss that later."

"I never knew before that spice had anything to do with the discovery of America," said Robert. "That's interesting."



Robert was cracking a big black Brazil nut.

"I have often thought," he went on to say, "of the interesting stories behind food. Take this nut," and he held it up; "the person who picked it must have had a dark skin and probably he didn't speak English. Think of the hands it must have passed through before it reached this table."

"There is some kind of miracle about food," said Ann. "Isn't it wonderful the way it becomes a part of the body! I wish I knew more about it."

"We shall try to answer this question and many others," said Miss Leader. "Can anybody suggest a new way to take up our health work this year? I should like to have it different."

"I've thought of something," said Robert, after a moment. "Let's imagine that we are broadcasting. I have an old radio set at home. We could put it on Miss Leader's desk. Behind the desk we could have a screen for the broadcaster to stand behind."

"Marian Hall is the president of our class. She might stand behind the curtain and introduce the speaker. It would take a good deal of work to get the talks ready, but Miss Leader would help the speakers. What do you think of it?"

"It's a great idea," agreed Alice. "Do you like it, Miss Leader?" she asked, turning to her teacher.

"Very much indeed," said Miss Leader. "If we all help, and I know we will, it ought to be a great success. It has always made me happy to have children in the other grades call us 'The Work Together Room.'"

I think we can do almost anything we set out to do." When Miss Leader said this, the boys and girls clapped and cheered.

"We have been keeping a notebook in geography this year," said Frank. "It has made me learn a lot about different parts of the world. Wouldn't it be a good thing to have a health notebook on foods?"

"Yes," added Dorothy, "and couldn't we have a health bulletin board? We might stretch a piece of green cloth across the wall in our room where we could fasten all sorts of things about health. It might have letters to the class from Miss Leader or some of the pupils. We could bring interesting things cut from newspapers and magazines. Perhaps our parents would help us. We might draw some pictures ourselves, ask questions, and give suggestions to the class by pinning material on the bulletin board. I think it would be a good plan to have a committee to keep the bulletin board neat. Every week or two the committee could see that it was all cleaned off so that we might start fresh again."

"That would be great!" said Marian, eagerly. "I wanted to say too that besides broadcasting health news and facts we might use the school lantern. We can get slides from the public library. And we might learn many interesting things about foods by going on study trips and excursions."

"What do you say? Shall we start the bulletin board as soon as we get back to our room? Shall we ask Miss Leader to give the first broadcast?"

"Yes, yes!" cried all the boys and girls, standing up and looking toward Miss Leader.

Just then the bell sounded. Miss Leader rose and said with a smile: "Thank you for the invitation. I shall have my speech ready by tomorrow. I must work hard to make it as good as some of yours will be."

Then the boys and girls of the Work Together Room (W. T. Room) started for their afternoon classes.

"I can hardly wait until tomorrow," said Grace to Alice. "Won't it be great fun?"



Marian has asked me to give the class some directions for keeping a notebook. You can get a loose-leaf notebook or one with the pages fastened into the cover. The loose-leaf notebook is better for this reason: pages may easily be taken out or added.

Here are some things to think about:

1. Try to make the notebook attractive. Paste some colored pictures on the cover.

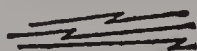
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**TO THE TEACHER:** This section, "The Health Bulletin Board," is intended to stimulate pupils to keep a class bulletin board and individual notebooks. It offers pupils a chance to discuss further the different topics appearing in their textbook, and it also suggests comments on notices appearing on their own bulletin board. A few minutes of each recitation might well be devoted to what individual pupils have put into their notebooks since the class last met. Problem projects may also be suggested.

2. Have a Table of Contents.
3. Leave a good margin on the left-hand side of the page.
4. Use good English.
5. Make your notebook your own. Don't copy somebody else. Put in pictures, drawings, tables, stories, and questions. Try to make it interesting to yourself.
6. Make every page neat.
7. Look up the meaning and the use of the new words you meet in your health work. Copy them into the notebook and see how your vocabulary will grow.

Good luck to you!

*Judith Leader*



The first broadcast tomorrow will be on "Why We Need Food," by our friend and teacher, Miss Leader. I think the chief reason we need food is to make us grow. What do you think?



*Marian*

I wrote to my cousin, who lives in another part of the country, about some of the things we have done to make our lunch room clean and pretty, and she would like some more suggestions as to what the pupils in her school can do to improve theirs. Can you help her out? Perhaps you would be willing to help by writing her a letter. I should be glad to give you her address. Perhaps you would like to put a copy of your letter in your notebook.

*Arthur*



## II

### *Why We Need Food—The First Broadcast*


THE children in Miss Leader's room came to school the next morning with bright eyes and smiling faces. At ten o'clock they were all in their places, waiting for the first broadcast.

Robert had brought the radio set. It was on Miss Leader's desk. Behind the desk was a pretty Japanese screen.

Promptly at ten o'clock Robert stepped to the radio set and began to turn the dials. The boys and girls waited breathlessly. Then they almost started from their seats to hear Marian's clear voice say :



Boys and Girls of the Abraham Lincoln School, this is Station HHS, which takes as its motto the words Health, Happiness, and Success. It is our purpose this year to broadcast every week radio talks about food and health. We believe that you will find them interesting and helpful. I have the very great pleasure today to present Miss Judith Leader, who will talk to you on the subject of "Why We Need Food." Miss Leader. [*Then a voice which everybody knew to be Miss Leader's began.*]

 Boys and girls, I have been asked to give the first of a number of broadcasts on health. I believe health to be one of the most precious things in the world, so precious that it is worth working hard to get, and worth keeping after one has it. The other day I came across a little story called "Health is a Great Treasure." I should like to tell it to you.

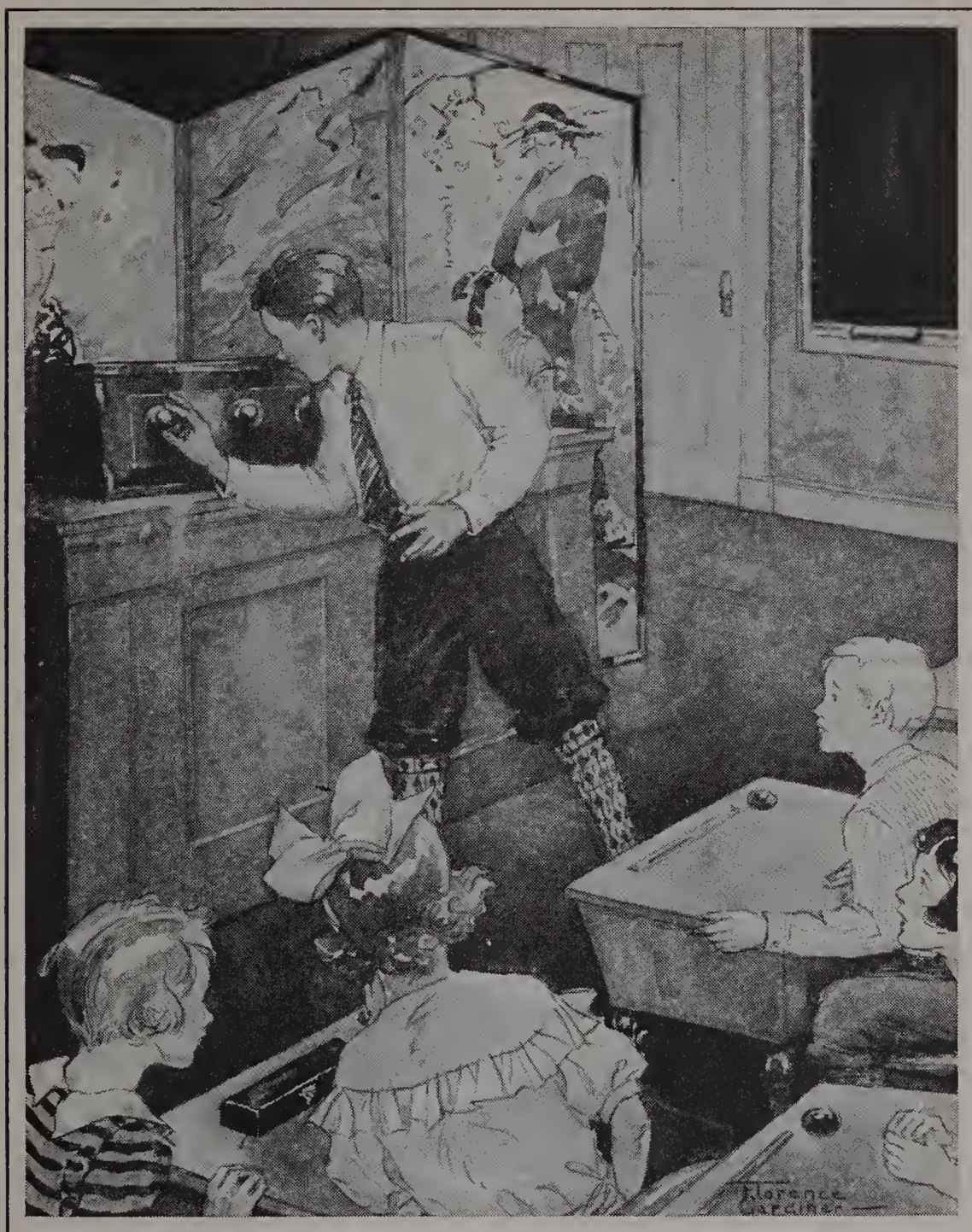
Once a poor workman who was making a long journey on foot came to an inn where he asked for some water and a piece of bread. He was cold, and he was cross because he had to travel on foot and because he could order nothing better of the innkeeper.

While he was eating his simple meal a rich man in his coach drew up in front of the inn. He asked the innkeeper to bring him some cold meat and a hot drink, which he enjoyed in his coach. The workman looked at him with envy, and thought to himself, "If I were only as wealthy as that!" The rich man noticed the look of envy on the workman's face, and said, "Should you like to trade places with me?" "Of course," cried the poor man, without an instant's delay. "If the gentleman will get out of his coach and give me everything that he has, I will give him all that I have."

Immediately the rich man ordered his servant to lift him out of the coach. What a sight he was! He was so crippled that he could not stand alone until crutches were brought to him.

"Well, my friend," he said, with a smile, "should you still like to trade with me?"





*Tuning in for the first broadcast*  
The boys and girls waited breathlessly



*A poor healthy man is richer than a rich cripple*



"No," said the man, bursting into tears; "a poor healthy man is richer than a rich cripple."

"How gladly would I trade with you!" said the rich man. "How quickly I would give my coach, my horses, in fact, everything I own, in exchange for your strong, healthy body! If I were only in your place!"

Then the rich man ordered his servant to lift him back into his coach; the poor man paid his bill and continued his journey on foot: the first, poor in spite of his riches; the second, rich in spite of his want of them. This is a story well worth remembering.

The other day a daily newspaper told the story of a wealthy business man who lost his right ear in an accident. He promptly offered \$2000 in cash to anybody who would be willing to have his ear removed so that it might be joined to his own and made to grow there. This offer was widely advertised in the newspapers, but so far as I know no one ever accepted it. In the city where this newspaper was printed there must have been a large number of people so poor in land,



houses, and money that they could have found a hundred different uses for \$2000. Surely some of them were so hungry that they were almost in danger of starvation; yet they chose to have both their ears rather than to have \$2000.

Even if you could, should you be willing to sell your ears, eyes, arms, legs, strong muscles, keen appetite, and all those things that go along with good health? I think not. How rich you are! What a loss it would be if you should fail to keep your health! Is health not worth working for? If you can get more of it, isn't it worth getting?

There are many things that we need to make us healthy, but food is one of the most necessary. Nothing that lives can get along without food. You know that if you have a pet, he must be fed properly. Just the other day a little girl I know named Ruth received a baby alligator as a present from her uncle who was traveling in Florida. The first questions that Ruth wanted answered were, "What do baby alligators eat?" and "How do you feed them?" Baby alligators, rabbits, puppies, or any other pets must have the proper food and enough of it to be healthy and happy.


Somebody may be thinking about plants. They are living things. Do they need food? Yes, they do. But plants make their own food from air and water and certain materials that they are able to take out of the soil. Notice that the farmer and the gardener use what is known as fertilizer for the soil; for if crops are grown in the same soil year after year,





*A big crop of lettuce*

Do you know whether growing plants need fertilizer as food? Why is lettuce so valuable to man as a food? How often do you eat it?

 the soil finally has so little nutritive, or food, material left in it that a good crop cannot be grown on the land until it is fertilized. Ask your mothers whether they use fertilizer for their plants.

Unlike the plants, animals cannot get their food directly from the soil; they depend on plants to get their food for them, or on animals that have eaten plants. Thus we see that plants have a very important work.

Just what does food do?

Before trying to answer this question directly let me ask you a few questions. Have you ever wondered about what makes things *go* in the world? Perhaps

you have stood near the railroad track when the fast train came roaring in. As it started off again did you watch the great engine begin to puff and pant, and finally rattle on so fast that soon it became a mere speck in the distance? Watch the speed boat as it skips across the water. When you went to the county fair, did you see the horse race? What made the horses go? When you get into the automobile to ride with your father, what is it that makes the machine go? Notice the man chopping wood. See the chips fly. How can the man do what he is doing? How full of life and movement boys are in playing football! Where do they get the strength to carry and kick the ball? Have you ever seen a dog run after a rabbit? How fast he runs across the field and jumps the stone wall! If you were to visit Holland, you would see windmills pumping water.

What is it that makes everything go? You may say that it is the wind that makes a windmill go and gasoline that makes the automobile go. But it is the energy in the wind and in the gasoline that makes the windmill and the automobile go. It is energy that makes college boys able to play football and a dog able to chase a rabbit over a wall. Just as the automobile gets its energy from gasoline, human beings get energy from the food that they eat. Activity is one of the forms in which the energy in the food which we eat appears. If for any reason a person becomes ill and loses his appetite, he is not equal to much activity. He may get so weak that he cannot move or speak







aloud. As you will learn in another radio talk, some foods contain much more energy than others.

The human body is very different from a machine like an automobile, since it may *grow*. Wouldn't it be funny if you could buy a small automobile and find that it became larger and larger day by day? You might buy a two-passenger car and in a few months find that it was a five- or a seven-passenger car. Everything that you know about in the world of life has a period of growth. Kittens grow into cats; puppies, into dogs; colts, into horses; and children, into men and women.

We all know that animals require plenty of good food if they are to grow strong and healthy. For that reason the farmer is careful that his pigs, chickens, and colts are well fed. Boys and girls must get a good supply of the right kind of food in order to grow. This has been shown in the case of Japanese children. We had always supposed that the Japanese were a smaller race than Europeans and Americans; we had thought that they were just born to be smaller; but when Japanese children in the United States were examined, they were found to be taller and heavier than Japanese children in Japan. The reason for this would seem to be that they had learned in America to eat foods which are better for growth than those which Japanese children eat in their own country.


Surely you want to be tall and weigh as much as most children of your age. This will depend a very great deal on the kind and the amount of food you eat.



*Ready! Go!*

It takes energy for boys to run a race. Where and how do they get this energy?

But the most important thing is not to have a certain height or weight but to gain regularly, month by month. Our school doctor, Dr. Baker, says that healthy children make this steady gain in weight. If we do not gain for two or three months, or if we lose in weight, that is, if we begin to weigh less, it is a sign that something is wrong. It may be that we are eating too little of the right kind of food. It may be in part that we aren't having enough sleep or are getting too tired. Dr. Baker says that we ought to keep a monthly record, or note, of our weight. In this way we shall be able to tell whether we are gaining or losing.

Food also helps the body to *repair* itself. This is something that no ordinary machine can do. 

When an automobile gets one of its fenders bent and some of the paint knocked off, it cannot repair the damage even if the gasoline tank is full. How different and how much more wonderful is the human body! If you cut your finger, it will repair itself, or heal, if the cut is washed clean and bandaged. The flesh and the skin around the cut will slowly grow together. Usually the finger can be used as well as ever unless the accident has been a very serious one. The body not only gets its nutritive material but is given the power, or is made able, to use it for repairs from the food eaten. How important it is that people who are ill and need to have their bodies repaired and built up should have good food! The body is always wearing out, and needs foods with which to repair itself.

Food also helps to keep the body warm. The warmth of the body is another way in which the energy in the food we eat appears. Notice that when the automobile engine runs, it gets hot. It may get so hot in going up hill that it has to be stopped until it gets cool again. As the gasoline explodes and burns up, the engine gets warm. You know that the gasoline burns up because smoke comes from the exhaust pipe. In much the same way our food is burned up in the body, and the body is warmed. When the automobile goes fast, the engine gets hotter and hotter. The faster we run or walk or work with our muscles the hotter the body becomes. Do you know how the automobile engine tries to keep cool? One way is by fanning itself. How may we keep cool?



When winter approaches, animals must adjust themselves to the change in temperature. In general, they become less active, less lively. Fishes may go to deeper water; birds may fly to the warm South; many animals must remain to face the cold winter. Some of these animals are able to find enough food to eat during the winter months; others hibernate, or go to sleep in some sheltered place. For example, badgers and bears do this. Since they are not moving around, they require little or no food to keep warm. Animals that hibernate usually put on a big supply of fat before winter, which is the result of the food eaten during the summer. This supply is used or burned up during the winter and keeps the body warm. So you see that even when the bear hibernates he is making use of food which he has eaten some time before.

I hope you have found this talk on the value of foods interesting. Can you remember the different reasons why food is necessary?

[*Next they heard Marian's voice saying:*] Boys and girls, this is Station HHS in its weekly health broadcast. You have been listening to the first of a number of talks on foods by pupils from the Abraham Lincoln School. They are given every Thursday morning. School children, parents, and others interested in health and food are invited to listen in and send us questions. This is Marian Hall announcing.



# THE HEALTH BULLETIN BOARD

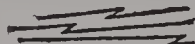


CORNELIA HOFF

Some of these sentences are true; some are false. Can you tell them apart? Tell why you think each one is true or false.

1. Gold is more precious than health.
2. Plants need food.
3. Everything that does something uses energy.
4. We need food to grow.
5. We need food to keep the body cool.
6. People hibernate.

Won't you please make out a list for me? I enjoy this kind of exercise.



*Mary*

I am putting into my notebook all kinds of pictures showing activity. From the magazine I have pictures of children playing, lion cubs biting each other, and sailors wrestling. I need some more pictures. Where can I get them? I should be glad of your help.



*William*

Here are some of the reasons why we need food. The letters of each word are out of place. Arrange them as they ought to be.

1. ygrene

2. tmhawr

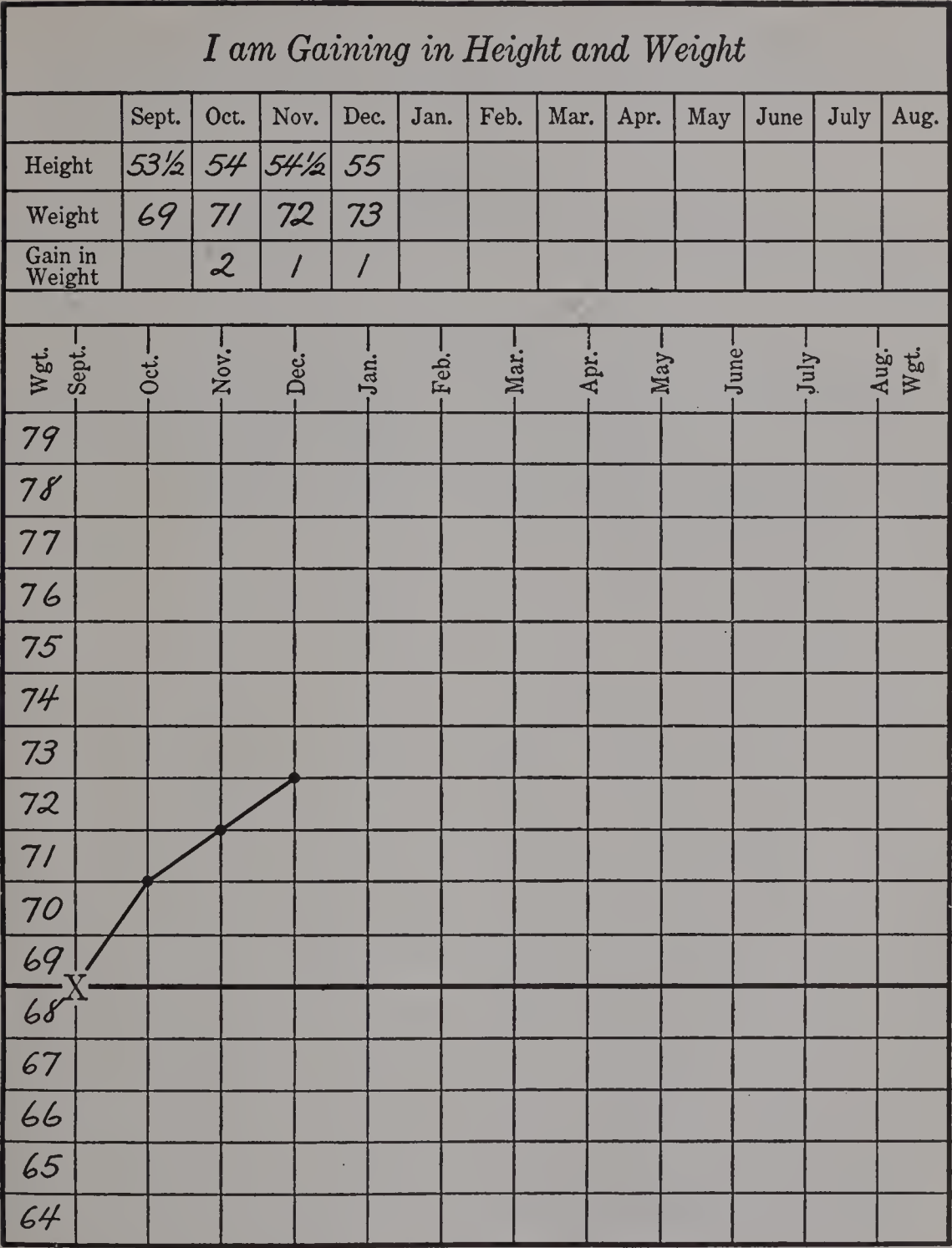
3. iraepr

4. otwhgr

Think up a puzzle for me.

*Arthur*

This is the way I record my height and weight :



Notice that I have gained in height and weight so far. Do you keep your record in the same way? It should tell an interesting story by the end of the year.

James



## Broadcasting Health

I learned three new words in today's broadcast:

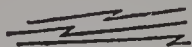
energy

nutritive

fertilizer

I looked them up in the dictionary. What is your list?

*Lewis*



Give me a 9-letter word meaning to sleep through the winter.

*Jack*



From now on, when mother rings the dinner bell, I shall be sure to answer. I've learned one thing from today's broadcast: you cannot work, or study, or even play, without food.

*Sidney*

### III

## *What Makes You Go*

IT WAS Thursday morning, the day when there were health broadcasts in Miss Leader's room. The children were talking about the broadcast of the week before, which they had enjoyed so much.

"I always knew that food was important," said Charles, "but I never dreamed that it was so necessary for our health and happiness. It must take a good deal of food to keep the body warm. Miss Leader, are we really using up energy every second of our lives?"

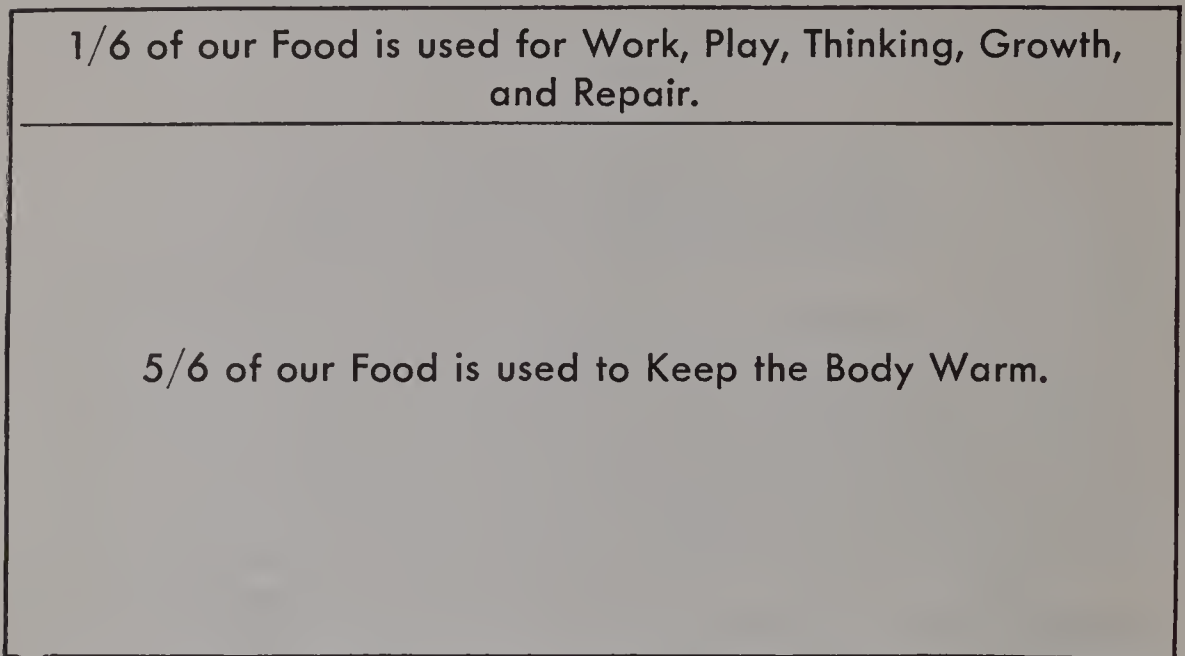
"Yes," replied Miss Leader, "we are in constant need of energy both to keep the body warm and to keep the heart beating and the lungs and other organs of the body working. You would scarcely believe how much the heart does. Even when a person is lying in bed all day and his heart is therefore doing the least amount of work, it uses enough energy to carry a man weighing 150 pounds up a hill 500 feet high. What does 500 feet mean? How high is your school building? How many times higher than this building is 500 feet?"

"I will work that out," said Charles.

"Does it take much food just to keep the body warm?" asked Mary, after a moment or two.

"Yes, a great deal," answered Miss Leader.

She stepped to the blackboard and drew a diagram like the one below.



*How our daily supply of food is used*

She pointed to the lower part of the diagram.

"Suppose this four-sided figure stands for all the food which the body uses in a day. Now notice how much of it is required to give the energy necessary to keep the body warm."

"Why, most of the food we eat is needed to keep us warm, isn't it?" said Katherine.

"Yes, indeed," answered Miss Leader with a smile.

"I should think we would have to eat more food in the winter than in the summer," said Raymond.

"I think we do," said Katherine. "In the winter don't we have better appetites, and eat more food?"

"Don't the Eskimos eat more food than the people in hot countries like Cuba and the Philippine Islands?" asked Tom. "I read in my geography book that some-





*A fruit market in the tropics*

Down toward the equator much fruit but little fat is eaten. Do you know why? Do you recognize any of the fruits in this picture? What does your geography tell you about the fruits eaten by people in tropical countries?

times the temperature in the Far North in places like Iceland and Greenland is as low as 50 or 80 degrees below zero. But down near the equator there is hot weather all the year round; there are no winter and summer like ours. They never have snows, and they don't know what frosts are. It doesn't cool off even at night, and people who go down there from the United States can't sleep because of the heat. I'm sure the people down in the tropics do not need so much food to keep them warm as the Eskimos."

"Tom is quite right," said Miss Leader. "We might explain this by making a comparison between our



*Valuable food in Eskimo land*

These Eskimos are very happy. The animal that they are dragging to their homes is a walrus. It is prized for its fat. Why is fat a necessary food in a cold country? Would a native of Central America enjoy walrus meat? When do you enjoy fatty foods most?

bodies and a furnace or a stove. You know that the stove in your kitchen or the furnace in your cellar needs a good deal of fuel in the winter; but as the warmer weather of spring comes on, it requires less and less fuel. Finally in the summer the fires die out. Our bodies behave in much the same way, though even in the hottest weather they still require some fuel."

"Do we have to eat more pounds of food in winter than in summer?" asked Mary.

"We need more food that gives the body warmth," said Miss Leader. "This may or may not mean more pounds. But listen."



"This is Station HHS," said a clear voice behind the screen.

The class turned around to find Robert tuning in on the radio. They had forgotten that it was time for their second broadcast. But Marian and Louise, who were to broadcast, had not forgotten.



Boys and girls, I have every reason to believe that our first broadcast was a success. Many persons have written us letters to tell us how much they enjoyed it. Here is one:

I liked Miss Leader's talk, especially the story, "Health is a Great Treasure." I never thought before how rich we might be even if we had no money in our pockets. May we have some more stories, please?

*Grace*

Here is another:

I am glad that we are to have broadcasts about food. Will the speaker tell us sometime about the kind of lunches we ought to get in Chew-Chew Inn? Mother thinks that I ought to eat more vegetables.

*Thad*

Yes, Thad, we shall take that up before long. Of course we want to know everything about foods that will help us to be healthy.

We welcome all your letters, and hope to receive many more. Please send them in care of Station HHS.






Now it is my pleasure to introduce the speaker of the morning. With Miss Leader's help she has carefully prepared her talk on "Foods That Furnish Fuel." Boys and girls, I have the very great pleasure of introducing Miss Louise Brown. [*All the children listened eagerly, with their pencils and papers ready for taking notes. Another voice now began:*]

Boys and girls, in our first broadcast Miss Leader told us how important food is, how it is the source of activity in our bodies, and is used for growth, repair, and warmth. You may be surprised to know that the amount of energy in food can be measured. Men who have studied such matters thoroughly have found out how to measure nearly everything. We measure the weight of a bag of sugar in pounds, the length of a roll of velvet in yards, and the content of a tank of water in gallons. When we measure potatoes or apples, we use bushels. You probably know that we even have ways of measuring electricity. Ask your father for his electric-light bill. How does the electric-light company measure its electricity? You might ask your father to show you his gas bill also. How is gas measured? When we come to buy and sell anything or try to decide what value to set upon it, we find that we must measure it in some way. Suppose that Mr. Jones wishes to sell Mr. Prescott some hay or eggs. They cannot talk about buying and selling without discussing measurement.

When scientists began to study foods, they wondered about the energy which is in different foods and

which we can get from them. Did a glass of milk contain more or less energy than an apple or an egg? How could anybody measure this difference? This question was answered by Joule, a famous English scientist. He found out the amount of energy in a food by measuring the amount of heat that the food could make. The word *calorie* is used to express the amount of heat, just as the word *pound* expresses amount in weight. *Calorie* comes from the Latin word meaning heat. By burning different foods, such as apples, that had been thoroughly dried, scientists have been able to tell how many calories foods contain. Thus we know that a large apple, a large orange, a large egg, and a slice of toast contain about 100 calories each.

Perhaps you are wondering how many calories you need every day to keep your body warm and to make you active. Children between 10 and 14 years of age need from 2000 to 2500 calories. The number of calories a person needs depends on his or her age, weight, and work. A person who sits at a desk all day needs perhaps not more than 2700 calories, because his body has so little activity, but the man who works hard out of doors shoveling snow may need as many as 5000 or more. I wish to know how many calories I am getting for my lunch. Have you seen what Barney put on our bulletin board? Those two pages of drawings of food portions, with the number of calories under each one, will be helpful. Miss Leader mentions two books that perhaps some of you would like to use to add up your calories also. 

This tells about the fuel value of my lunch :

	CALORIES
1 cup of vegetable soup . . . . .	10
1 helping of spinach . . . . .	24
1 potato . . . . .	100
1 boiled egg . . . . .	100
2 slices of bread . . . . .	200
1 square of butter . . . . .	50
1 dish of apple sauce . . . . .	100
1 glass of milk . . . . .	160
Total . . . . .	<u>744</u>

In days gone by it was thought that if people ate food containing enough calories, they would be in good health. The right number of calories is necessary, but now we know that there are other things that both animals and human beings need in food besides calories. What they are we must leave for other broadcasts. Now it is time to say good-by.

[*Then a well-known voice said:*] You have been listening to a health broadcast from Station HHS. Miss Louise Brown has just given an interesting talk on how we can measure the energy in foods. This station broadcasts talks on health every Thursday morning at ten o'clock. Please write us if you are pleased with the programs. Also send in some questions. This is Marian Hall signing off at ten thirty. Good-by until next Thursday morning.



"That was a fine broadcast," said Philip. "It will be fun to know about the calories in different foods. I shall count up the calories I have for luncheon."



"May I ask some questions about the diagram you have on the blackboard?" asked Martha.

"Certainly," said Miss Leader.

"I notice that only one sixth of our food is used for all the other things besides keeping our bodies warm. Wouldn't it be possible to waste so much of our energy that we should have little left for work? I should think that when we were asleep we'd use very little energy. Suppose we stayed up late at night. Shouldn't we have less energy for our school work? There is just so much energy, and if we use up some of it for one thing, then we can't use it for something else."

"Quite right," said Miss Leader with a smile. "Martha has done some real thinking. I find that I cannot do so much work or do it so well if I lose much sleep. I also find that I am more likely to be cross. Children need sleep even more than grown-ups."

"I have a question, too," said William. "Should we be able to grow up if we didn't eat enough food to keep the body warm, or if we didn't get enough sleep? I want to grow up tall and strong like my father," he said, sitting up very straight and clenching his fists. "He pitched on his college team."

"How clever this class is today!" said Miss Leader. "Of course, we must have enough food of the right kind and plenty of sleep to be able to grow and be strong."

"I want to know all about food and energy, too," added Margaret. "My ambition is to be a great swimmer like Gertrude Ederle or a tennis player like

Helen Wills Moody. If I knew more about foods and energy, perhaps it would help me."

"I am certain it would," said Miss Leader. "But it's time for us to begin our arithmetic lesson now. Perhaps in your English class you will have a chance to tell me more about your ambitions and the things you would like to know about foods."

"Couldn't we make our arithmetic lesson today have something to do with foods?" asked Frank.

## THE HEALTH BULLETIN BOARD

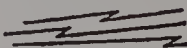


CORNELIA HOFF

Here is a filling-in test on the second broadcast. Copy these sentences in your notebook, and see how many of the blanks you can fill correctly.

*Judith Leader*

1. Every time we walk, talk, or do anything we use .....
2. .... of our food is needed to keep the .... warm.
3. Our energy comes from our .....
4. We need more .... in winter than in summer to keep the body .....
5. The amount of energy in food may be .....
6. *Calorie* expresses amount of .... as *ton* expresses amount of .....

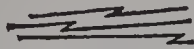


I am putting into my notebook all the pictures I can find of animals that try to save their energy by hibernation. I have put in a picture of a woodchuck. What

other animals would you suggest? What have you put into your notebook since our second broadcast? *Ann*

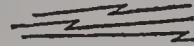


We all know that an acre is a measure of land. How many other measures with their uses can you name?



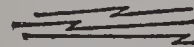
*Dorothy*

Tomorrow can't we use the numbers of calories in the food we ate today for addition and subtraction examples in our arithmetic lesson? We can find whether girls or boys eat more calories.



*Norman*

Let us all suggest meals for peoples living in different lands. I shall write out a menu for an Eskimo family.



*Rose*

I learned three new words in today's broadcast:

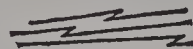
scientist

calorie

fuel

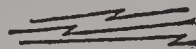
How many were new to you?

*Kevie*



Our school doctor says that I do not weigh enough and that I ought to gain faster. When he found out what I was eating, he said that I must have more calories. I must drink more milk and eat creamed foods and eggs. What else should you advise me to eat?

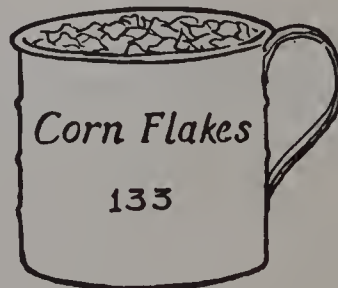
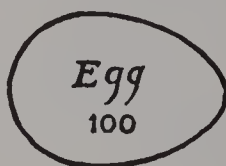
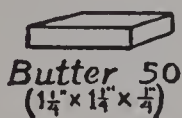
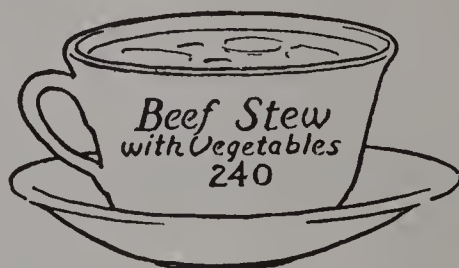
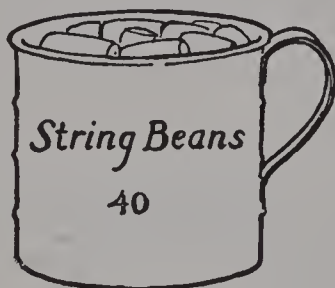
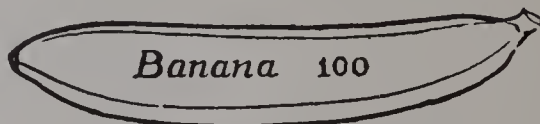
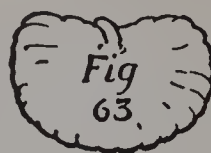
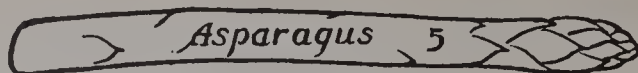
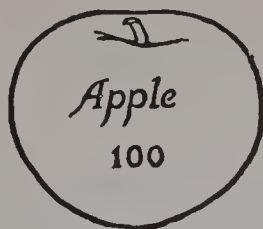
*Alice*

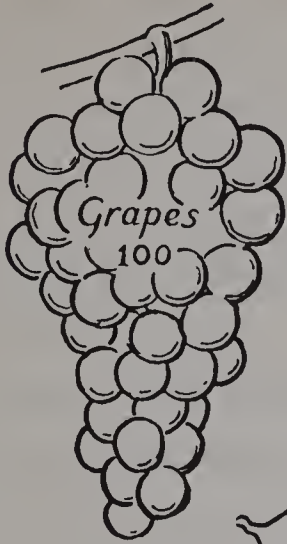


My sister studies about foods in college. She gave me these two pages of drawings of different portions of food. On each drawing is the number of calories of each portion. I am going to use them to check up on the number of calories I have for lunch. Perhaps you would like to try it, too.

*Barney*



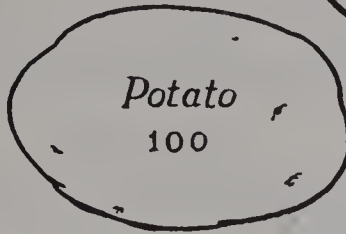




Grapes  
100



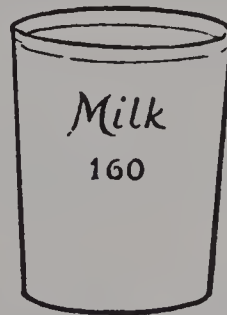
Lettuce  
3



Potato  
100



Sweet Potato  
200



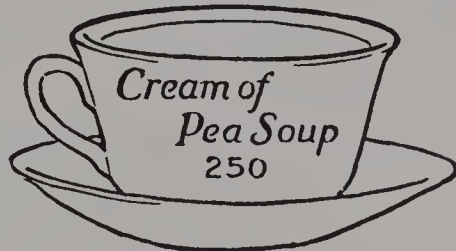
Milk  
160



Orange  
100



Onion  
25



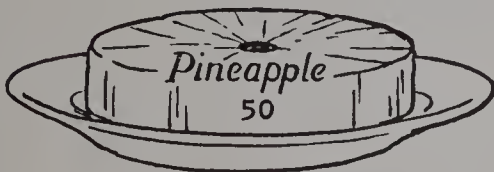
Cream of  
Pea Soup  
250



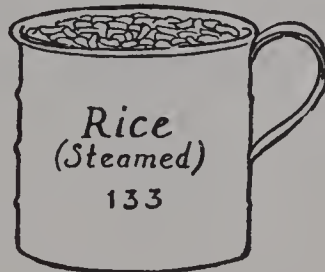
Tomato  
35



Peach  
35



Pineapple  
50



Rice  
(Steamed)  
133

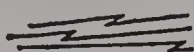


Spinach  
(Cooked)  
40



Puffed Wheat  
50

I have put on the reading table two books that give the calorie values of common foods. They are Andress, Aldinger, and Goldberger's "Health Essentials" (Ginn; see pages 121-127) and Rose's "Teaching Nutrition to Boys and Girls" (Macmillan; see pages 181-185). You may like to use the tables in these books for checking your lunches.



*Judith Leader*

Our general-science teacher says that a calorie is about the amount of heat that will raise a half-teaspoonful of water one degree. I am glad to know just what this word *calorie* means. I find that there are many older people who use it frequently but can't really explain to me what a calorie is except that if one increases the number of calories in his diet, he may gain in weight, while if he decreases the number, he may lose weight.

Our teacher has also told us some interesting things about degrees of heat. In this class, when we use the word *degree*, we mean Fahrenheit (F.) degrees. This is the kind of thermometer we have in our schoolroom now. The one just outside the window is a Fahrenheit thermometer also. According to this thermometer, water boils at 212° F. and freezes at 32° F. Scientists use another kind of thermometer called centigrade. What do you know about it?

*Martha*



## IV

### *Foods That Furnish Go-Material*

**A** GAIN the boys and girls were in Miss Leader's room. Robert stepped forward with his watch in his hand, saying, "I hope I am not too late. It's time for our weekly broadcast on health." He adjusted the dials on the radio. Immediately there was a buzzing noise and a voice began :




You are listening to Station HHS in its weekly broadcast on health. Each week there are broadcast from this station useful talks about food and health. Each speaker has carefully prepared his or her talk. In our previous talks we have been thinking about the energy in food. I'm sure you are eager to know whether all foods have energy and which ones are especially rich in energy. This question will be taken up by our speaker today. Allow me to introduce Alice Harmon.

[*Then Alice's voice began:*] Our announcer, Marian, has suggested that I might answer some of the notes that were sent in care of this station.

Robert writes :

It is fun to count calories. I have counted mine every day this week and find that I am

 getting enough. What I want to know is whether I must go on counting calories every day. I have just read that the average length of life is about fifty-eight years. I am now eleven years old. I have forty-seven years longer to live if I live the average number of years. Must I go on counting up my calories for forty-seven years in order to be healthy?

Sincerely yours,

*Robert*

Why, of course not, Robert. If you find after a few days that you seem to be getting enough calories and also that you are gaining in weight and are full of health, you need not think about calories any longer. But if you were overweight, you might like to know what to eat so as to get fewer calories; for if the calories you eat are not used at once in activity or in warmth, they may be stored in the body as fat. Then again, if you were very much underweight and did not gain, it would be helpful to know what foods to eat in order to get more calories. The word *calorie* is such a common word in hygiene that everybody ought to know what it means. If you are underweight or do not gain, you must simply eat more foods that contain a great many calories. Try to find out what they are.

But now I must turn to my talk. I want to tell you more about the foods that furnish the body with energy and heat. They are the *fuel* foods, carbohydrates and fats.



*Two kinds of fuel*

Probably you have never thought that bread, milk, butter, potatoes, meat, and coal are very much alike. Yet they are all fuels. Each furnishes energy and heat. Can you explain? How are they different?

The carbohydrates are the starches and sugars. They come for the most part from plants. At least one half of the heat of the body is supplied by sugars and starches. Starches are the main foodstuffs in potatoes and vegetables, and also in food made from grains, such as flour, oatmeal, and corn meal. Sugar is found as table sugar and in large amounts in fruits and honey. As you know, fresh milk also contains sugar. This is about the only way in which we can get sugar from animals.

Since it is so much warmer in summer than in any other season of the year, it is easy to understand that we need far less carbohydrate in summer. That means that in warm weather the amount of candies, cookies, sweet desserts, and all such foods should be cut down.

Children even more than adults are likely to eat too much sweet and starchy food. When





more of these foods are eaten than the body requires, too much fat will be added to the body. The eating of too much sweet and starchy food is one of the very worst habits that American children have.

Fat is one of our valuable foods. It furnishes about one third of the heat which the body needs. It is very useful in cooking, as it gives food flavor. Have you ever heard your mothers or your grandmothers say that "Fatty foods will stay by one"? This means that for a long time after we have eaten a meal which contains fat we do not feel hungry. We have a feeling of being satisfied. Men who have studied foods tell us that the reason for this is that the fat remains for a long time in the stomach and so prevents us from feeling empty.

Like sugar and starches, some of the fats in food may be stored as fat in the body for that time when the amount of food eaten does not supply enough energy. Can you think of a time when people need to draw on a reserve, or extra supply, of energy? Do you know whether one is likely to gain or lose weight in taking a long hike? When a person is ill for a long time, what happens to his weight? Do you know why?

We all need to have a certain amount of fat stored up in the body. It not only is a source of energy, to be drawn on in case we need it for warmth or activity, but it acts as a pad, or cushion, for the organs of the body. And as a covering under the skin it helps to keep the body warm.

If too much fat is eaten, it may upset the stomach. Often it may seriously lessen the appetite.

All foods that come from milk, such as butter, cream, ice cream, and cheese, contain excellent fats for children. Fat is also found in vegetable oils, such as olive oil, corn oil, and coconut oil, and in fat meats of all kinds, nuts, and yolks of eggs.

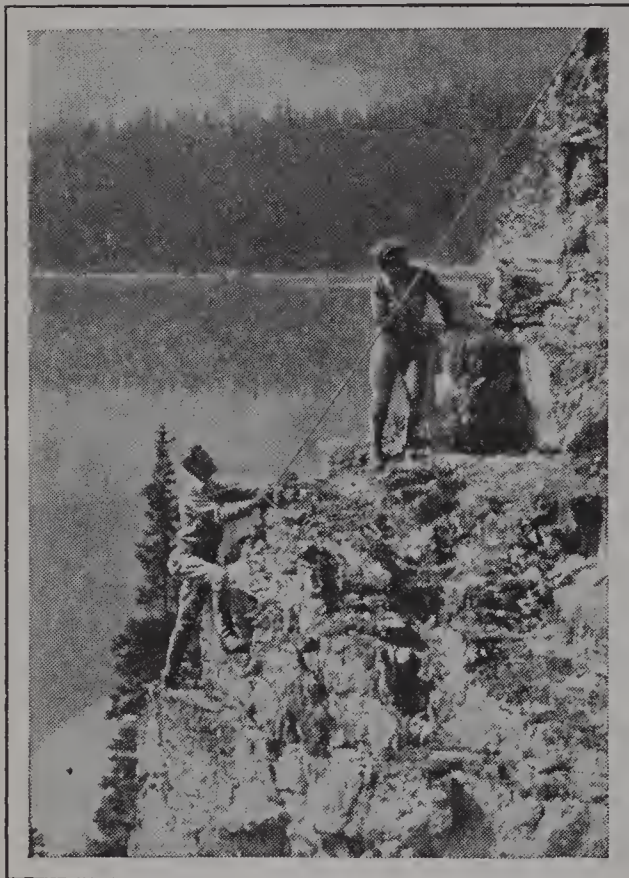
Now we have come to the end of our third broadcast. You know now that we must have fats, sugars, and starches both for heat and for activity, and for storing away a reserve in the form of fat. We cannot do without them. I have said something about the danger of eating too much of these foods. That does not mean that they are not good foods. They are excellent. It would be a fine thing for us to keep a record of what we eat for several days and talk it over in class with our teacher. Let us try also to put some interesting things on the bulletin board. Good-by.

[*Then the usual voice was heard saying:*] Boys and girls, this is Station HHS. You have been listening to a talk on carbohydrates and fats in our food. We hope that you have enjoyed this talk by Alice Harmon, and that you will discuss among yourselves some of the questions she has brought up. Until next Thursday, Station HHS bids you "Good day."



"Isn't it fun to think of the body as an engine or an automobile!" said Arthur. "I never knew before that

starches and sugars and fats are so valuable as fuel. My father belongs to the Appalachian Mountain Club, and I remember now that he always carries chocolate



*Climbing mountains*

It takes a good deal of strength to climb.  
What are some of the best kinds of food  
to take? Why?

bars with him. I suppose the reason is that they contain so much energy."

"I have just been reading a story about Peary's trip to the north pole," said Hilda. "It tells about the large amount of fat that the Eskimos eat. Even the white men in Peary's party ate plenty of it, too. One of the pictures in the book shows some Eskimo children eating tallow candles the way we do candy. Tallow doesn't look good to me."

"It would if you were in that awfully cold country," broke in Tom. "I have read that it sometimes gets to be 70 degrees below zero there. We think it's very cold here when it gets down to zero. The fat the Eskimos eat helps to keep them warm. If they tried to live on the kind of food we eat, they would die."

"I wonder why the speaker put starches and sugars





*Sugar cane in Central America*

Do you know how much of our sugar comes from Central America? how much from the United States? Find all you can about sugar in your geography. Make a map showing where our sugar comes from

into one group called carbohydrates. Why weren't they kept separate?" asked Mary.

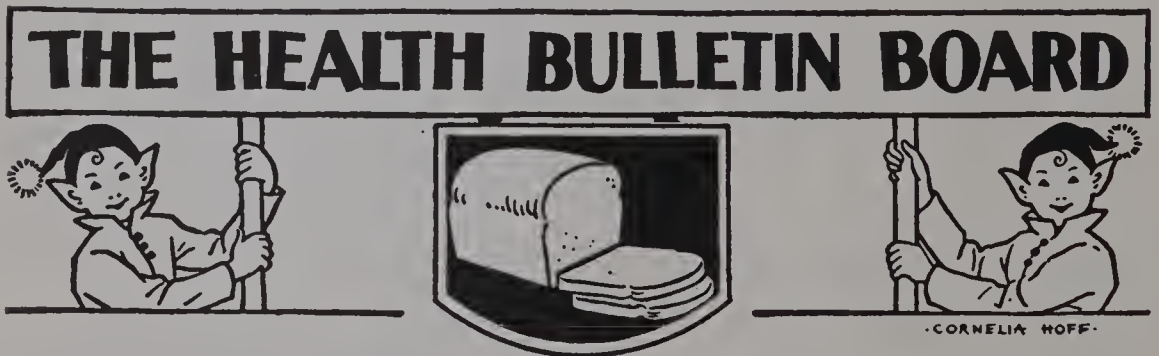
Nobody made any effort to answer this question. Everybody looked toward Miss Leader, who said: "There are several reasons, but one of the principal ones is this — that they are so much alike. You may not know that the body cannot use the starch at all until it is turned into sugar."

"Who turns it into sugar?" asked John.

"We do," replied Miss Leader. "That is about the first thing we do with carbohydrates. Let us think of a piece of bread. It is made up mostly of starch. As

it is ground up by the teeth it is mixed with the moisture in the mouth called saliva. This saliva starts at once to turn the starch into sugar. When the food has left the stomach and goes into what we call the intestines, a long, coiled tube leading out of the stomach, it meets another kind of liquid, which finishes the work of turning the starch into sugar. In one of the later broadcasts you will learn how this sugar is used by the body."

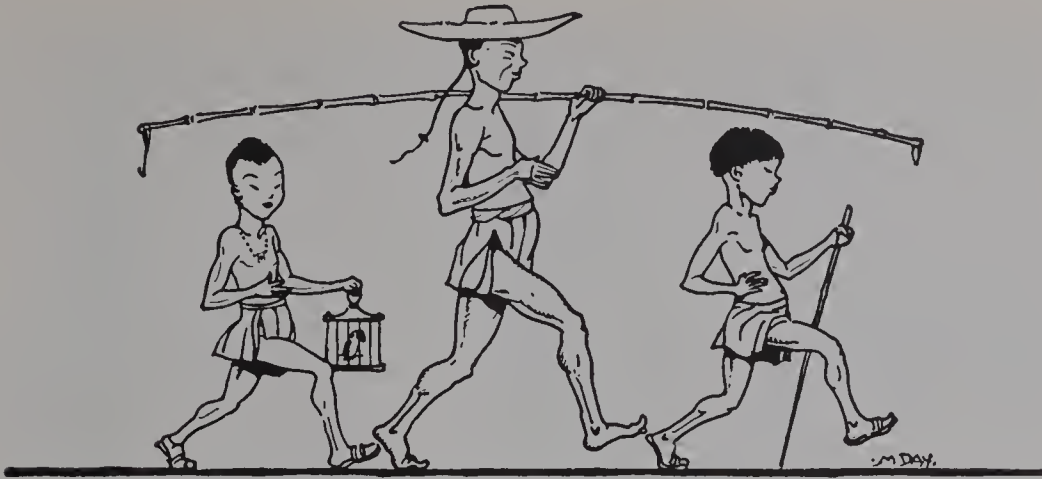
"What wonderful things the body does!" said Thad. "I wish next Thursday were here now. I want to learn more about the foods the body needs for health, strength, and success."



Did you ever think how important food was during the World War? England needs to import about half her food. It comes by ships from different parts of the world. If Germany had been successful in her attempt to sink those ships with her submarines, England would have gone hungry and the Allies would have lost.

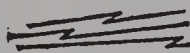
One reason why Germany lost the war was because she didn't have enough fat. Fat was needed to supply energy and to keep the soldiers happy. Without enough fat for food, people feel dissatisfied with life.

*Grace*



*Chinese eat large quantities of rice*

In the Sunday newspaper I saw a picture of some poor people who had been living almost entirely on rice. They all had large stomachs, because to get enough fuel to supply the body they had had to eat a very great deal of rice. It takes nearly eight pounds of rice to give the same number of calories as three quarters of a pound of butter or twelve ounces of olive oil. Do you know what rice contains? In what is it lacking? What do we need to add to rice to make a well-rounded-out meal? Why?



*Tom*

Sugar cane is the name of the plant that gives us much of our sugar. When people in the South cut their sugar cane, they often chew a good deal of the stalk. They usually take on weight. Do you know why? *Robert*



I have just read in my geography about making maple sirup and sugar. They are excellent foods. Back in colonial times they were important sources of sugar. I have found an interesting picture for my notebook. My grandfather says it carries him back in memory to long ago when he used to help gather sap with an ox team. It





*Gathering sap*

was then taken to a camp where it was boiled down and made into maple sirup and sugar. I visited a sugar camp last spring among the Green Mountains of Vermont. The smell from the boiling sap was very pleasant. Can you tell me whether maple sugar is better than ordinary white table sugar? Look up the subject of sugar in your geography. From what states do we get most of our sugar? How much of our sugar do we get from Porto Rico and the Philippine Islands? from foreign countries?



*Martha*

Dr. Wright says that as most children eat too many sweets, it is a good plan to put only enough sugar on our food to give it a pleasant flavor. I am trying to form the habit. I am telling in my notebook what I'm doing. What interesting things are you putting into your book?

*Mary*

I learned three new words in today's broadcast:

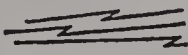
reserve

starches

saliva

How many were new to you?

*Betty*

  
Isn't it funny that the color of cabbage, lettuce, spinach, and other leafy vegetables and the color of the GO sign of the traffic lights is green? Shouldn't we go ahead and eat plenty of green vegetables?

*Minnie*

## *Foods That Furnish Grow-Material*

STATION HHS was again on the air in the regular Thursday-morning broadcast. Thomas O'Hara was the speaker of the day.



Boys and girls, today I want to tell you about another class of foods, called proteins. Like the carbohydrates and fats, they also furnish energy, but a smaller amount than either of these. Proteins furnish about one sixth of the energy needed to keep the body warm. You may remember that the carbohydrates and fats supplied energy and heat, and that what was not needed immediately was stored in the body as fat. The proteins do something that is very important, something that no other class of foods can do. They repair the body as it wears out. They build new tissues, the name given to the material out of which the body is made. Let us make a special mention of the case of the muscles. No other class of foods builds muscles. As the muscles make up about one half of the body, you can see how necessary it is that they should be kept healthy.

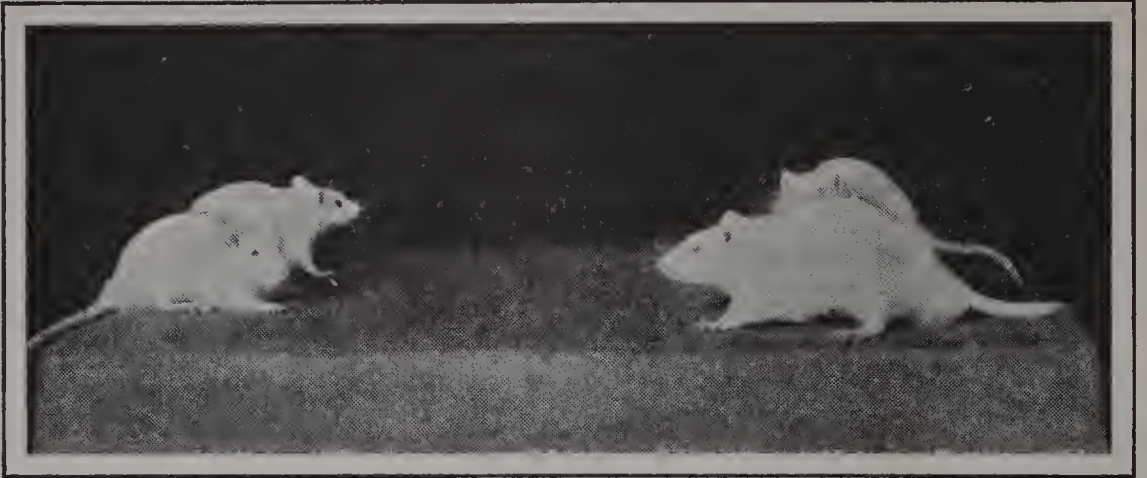
There are both animal and vegetable proteins. Among the foods containing animal proteins are milk,



cheese, eggs, fish, lean meat, and such other meats as sweetbreads, kidneys, tripe, liver, and brains. Vegetable proteins are found in peas and beans, and in all sorts of cereals, such as corn, rye, and whole wheat. Nuts of all kinds are rich in vegetable protein.

Although protein foods furnish some energy, they are not the best foods for that purpose, but as builders and repairers they are necessary for boys and girls. Just think for a moment of how fast you are growing. Do you remember how many more pounds you weigh this year than last, and how many inches taller you are? It would be impossible for your flesh or tissues to increase in amount unless you ate proteins.

Perhaps you never thought very much about it, but your body, like any other machine, is always wearing out. You know that the parts of your bicycle that are used most wear out and that you must get new parts in their place. Every now and then, you remember, your father has to have his automobile repaired. Although you cannot see the wearing out of the body as easily as you can see the wearing out of an automobile, it is something quite real. The body is a much more wonderful machine than an automobile or a bicycle. They must depend on others for repair. The human body can do its own repairing, but it cannot do it without the right kind of building material. Just as a brick building needs bricks for repair, so the body must have proteins to make up for its wear and tear. No other kind of food will do. How necessary protein is in our diet!



*Protein makes the difference*

One of these rats was fed on a high-protein diet and the others on a low-protein diet. Do you know which one was fed on the high-protein diet?

You will remember that Alice Harmon told us that when we eat too much sugar, starch, and fat, the part which we do not need for immediate use may be stored away in the body as fat. You know that whatever food your mothers have left over after a meal may be stored away in the pantry or the refrigerator. It may not be necessary to order anything from the store for a little while because of this supply that can be drawn on. In just the same way, if at some time the body needs more energy than can be supplied by the food being eaten, it may draw on its supply of energy, which is in the form of fat. But the body is able to store very little protein. This means, then, that everybody should eat some protein every day. Since children are growing, they need a good deal of protein. I think it would be great fun to think of everything you ate for dinner. Which of the foods had protein in them? Remember that if your muscles are to increase in size so you can

be a good baseball player or hockey player, you will need to eat protein. Good-by.



To this broadcast from Station HHS Marian added a few words, as usual.

"Every broadcast we have tells us about something in food that we must have if we're going to be healthy and strong," said David. "Why do we need to know about all these things? Doesn't our appetite tell us what to eat? Didn't people live and get along all right before they knew anything about foods and eating? They just ate what they wanted to eat. They followed their appetite."

Miss Leader looked around the room to see who would answer this.

"I don't think David is altogether right," said Marjorie. "It is true that people live without knowing much about foods, and that some of them are healthy; but all of them aren't. My father is a doctor, and he is specially interested in foods. He says that many children and grown-up people today are not properly fed."

"Maybe they haven't money enough to buy food," said David. "Of course, poor people can't be so well fed as people who have money. Rich people can eat any kind of food. If their appetite tells them to drink milk, they have money enough to buy it."

"My sister teaches about foods in college," said Ann. "She told me that the children in well-to-do parts of



the city are not growing as they should any more than those living in the poorer neighborhoods. She says that even with plenty of food these children seem to be starving. The reason is that they do not eat what they should, but they do eat what they want. So appetite is not a good guide."

"I am quite sure of that," added Roger. "I have a cousin who will not eat good food like carrots and spinach. He turns up his nose at them and says, 'No, no, no, I don't like them!' If his mother tries to make him eat, he often cries. He needs to have his appetite changed."

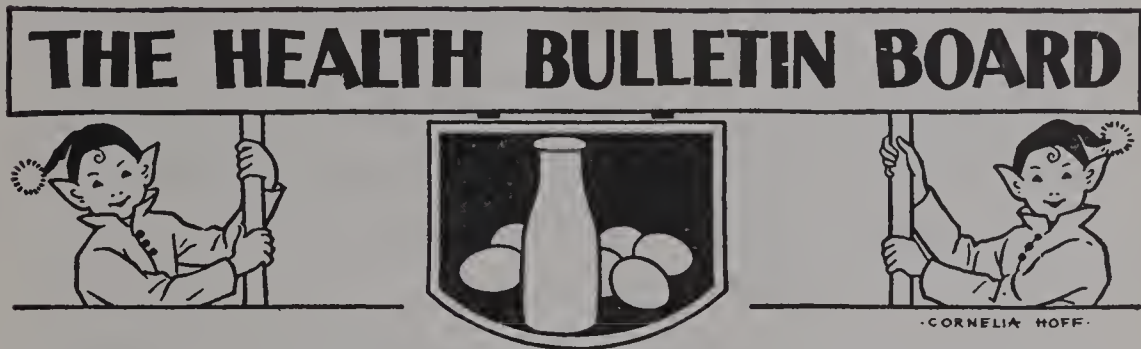
"I know a boy who couldn't get his working papers because he was so much below weight and so thin and weak. He asked what he could do, and the doctor said, 'Eat more nourishing food, get more sleep, play more in the fresh air and sunshine.' He did what the doctor ordered, and in six months he got his working papers. Now he is earning money and helping his mother. Learning to eat more nourishing foods helped him to succeed."

"It looks as if I were wrong," admitted David. "I guess we need some rules to go by. I'm afraid my appetite needs to be trained. I have never cared for spinach. What can I do about it?"

"Just make up your mind that you are going to eat it, and then eat a little every time it comes to the table," chimed in Mabel. "Soon you will want half a plateful."

"Thank you, Mabel. I will try. I want to know more about the appetite."

"The broadcasters will have more to say about it later," exclaimed Miss Leader, looking at her watch.



Since I gave my broadcast in which Miss Leader helped me so much, I have found this in a book. The word *protein* comes from a Greek word meaning first. So in foods protein is one of the things that must come first. That is why milk is the primary, or first, food used for babies to help them to grow, because it is rich in protein.

How fast babies grow! When the average baby is born, it weighs about  $7\frac{1}{2}$  pounds. This weight doubles at 6 months, and in 12 months it is three times as much as at birth. The baby's brain is  $2\frac{1}{2}$  times as large at the end of a year as it was when the baby was born. Without protein nobody could grow. Somebody has said that it's the chief business of the child to grow. I am going to eat enough to be strong and healthy. How about you?



*Alice Harmon*

I heard Dr. McGovern in an illustrated talk last night tell about his travels along the Amazon in Brazil. He and his companions ran out of their American food and had to live like some of the natives. What do you suppose they ate? One thing they ate was live ants. The ants were big fellows. The men had to know just how to pick them up so they wouldn't hurt and then had to bite off their heads very quickly. Do you know that there

are still people in some parts of the world who eat rats, grasshoppers, and snakes? What we want to eat is partly due to custom. Dad says that when he was down in old Mexico the food was so highly seasoned with pepper that he could not eat it. I like our own foods best, don't you? I know that we can change our appetites because I have learned to like several new foods, such as carrots and spinach. Let us put on the bulletin board the foods we have learned to like.

*Mabel*

Mother says it's interesting to notice how we add proteins to starches in many of our recipes. For example, we add cheese to macaroni and eggs to our cakes. Can you think of other examples?

*Ann*

What's the difference between *receipt* and *recipe*? Do you know? I have looked it up.

*John*

We have learned that we need "Grow" and "Go" foods. Let us plan to use two pages in our notebooks to write down our foods each day for a week under these headings.

*Eve*

I learned three new words in today's broadcast:

protein

refrigerator

nourishing

Which ones were new to you?

*Belle*



## VI

### *Water and Air for Good Health*

IT WAS just before the regular Thursday-morning health broadcast.

Miss Wise was talking to the boys and girls. They were all listening hard to what she had to say.

"Do you know," she said, "that this class is doing some of the most interesting work in this building? I am proud of the way the whole school has worked to fix up Chew-Chew Inn, but I am especially proud of the pupils of this room. Your broadcasts are so interesting that I enjoy every one I hear better than I did the last. I do not want to miss a single broadcast. When I asked somebody who was behind all this, the reply was, 'Miss Leader. You know she will let you try out anything that is sensible.' But when I asked Miss Leader, she said it was the children. 'They suggested it and have carried it out themselves.' So I have decided that you must all have praise, for both teacher and pupils have pulled together splendidly. Children need a good teacher, but the teacher needs loyal pupils. In this room we have both. I hope every other room in this building may earn the title of being called a W. T. Room (a Work Together Room). Good luck to you."

The pupils were still clapping their hands as Robert stepped up to the radio set to tune in for the broadcast.



Perhaps all of you do not know that Beatrice Allen went on a long journey this summer. She is going to tell us a little about it today. Boys and girls, permit me to introduce Beatrice Allen.

[*Then the voice of Beatrice was heard:*] I am going to ask you to use your imagination. Last summer our family took an automobile trip to the western coast. When we were traveling through Ohio, Indiana, Illinois, and Iowa, we saw that there had been plenty of rain. The plows in the fields turned up moist earth, and the crops looked green and healthy. As we continued on our way westward through Nebraska and Wyoming we noticed that the earth became drier and drier and trees and plants became fewer in number. In some places the land had been irrigated and was producing wonderfully. *Irrigated* means that canals, or troughlike paths, have been built to bring water to the fields. From the canals the water is carried through ditches to the growing crops. Thus, much land which was once useless for farming has been made to grow delicious strawberries, and celery, sugar beets, alfalfa (which is a good food for dairy cattle), and other crops. Water has worked the miracle.

After we had passed Cheyenne and were traveling through the Rocky Mountains, we came to what our



*Rainfall map of the United States*

What parts of the United States have the least rainfall? the heaviest rainfall? moderate rainfall? What kinds of food are produced in each part?


geographies call the Continental Divide. It has been given this name because it is a dividing line between the streams that flow eastward from the mountains and those that flow westward. After we left Salt Lake City we crossed the driest, dustiest stretch of land in the United States, a great area where there isn't enough rainfall for farming or enough water for irrigation. But what a change we saw when at last we reached the western slopes of the Sierra Nevadas! There we found mountain streams and thick evergreen forests, and in the valley beyond, wheat fields, vineyards, orchards, and pastures. Once again WATER had worked a miracle. If you look in your geographies, you may find out





*The great Sahara Desert*

A region where only those plants and animals that need little moisture can live. Find out from your geography what they are

 why the western slopes of these mountains have more rain than the eastern slopes. Do winds have anything to do with carrying moisture? In which direction do the winds blow west of the Rocky Mountains? Are they moist? If so, where do they collect the moisture? What happens when moist winds try to get over high mountains? If you look at a map [see page 61] which shows the yearly amount of rainfall, you will find that those regions which have little rainfall produce no crops. In California there is a place called Death Valley, which is almost rainless and so has almost no plant life. Death Valley was so named because in the days of the California gold rush several people died of thirst or starvation in crossing it on


their way to the gold fields. I believe that everything that lives requires water.

You may be surprised to know that much of the human body is water. About three fourths of a child's body is water. Even a larger part of a plant is water. The human body and the plant must always have this great amount of water in them. If it is not watered, then, a plant will gradually wither and die. About the same thing will happen to a human being. The body loses its moisture rapidly. One way is through the sweat, or perspiration, which collects on the skin and then evaporates. In hot weather especially this loss makes us thirsty, and soon we should be very uncomfortable without water. Since water has no heat or energy in it, we may not think of it as a real food; but no matter what it is called, it is even more important in some ways than food like bread, meat, and eggs. We can live for a long time without food if we have water. It is impossible to live more than a few days without water.

Let us think of some of the uses which our bodies make of water. Water forms a large part of the liquids of the body. For example, our tears are largely water, with a slight mixture of salt. Perhaps you think that when we cry is the only time we have tears, but that isn't so; we always have a little tear fluid in our eyes, and that's what keeps them moist.

There is also a watery fluid in the joints of the bones. It allows the bones to move easily without pain. The liquid in the mouth, called saliva, is nearly all



 water. Without saliva we should have a good deal of difficulty in swallowing our foods, especially those that are dry, like crackers. The saliva not only wets the food so it can be swallowed, but, as Miss Leader told us, it also contains something which changes starch into sugar so it can be used by the body. Do you remember how uncomfortable your mouth feels when you are off on a long walk and cannot get water to drink? Your mouth grows dry and sore. The other digestive juices, or juices that help us to digest our food, which are found in the stomach and intestines, contain water mostly.

The nose is also well supplied with a watery fluid. It makes our breathing more comfortable and it catches some of the dust we breathe in.

A healthy skin is not dry. Dryness of the skin is very disagreeable. Often the skin is cracked, causing itching and serious sores.

Everybody knows that blood is necessary for life. As it flows through the walls of the intestines it sucks up digested food and takes it to the parts of the body where it is needed. The blood also carries off some of the wastes from the body. As the blood flows through the muscles and other parts of the body it sucks up poisons and wastes that are afterwards drained off. If there is not enough water in the blood, the blood cannot do its work and the body cannot be kept healthy.

You probably know that the engine of an automobile must be kept cool; if it got too hot, it would melt, and then it would be ruined. As you know, a radiator






*Drink plenty of water*

Won't you join the parade?

or a tank of water keeps the engine cool; but sometimes in hot weather, when the engine is climbing a hill or mountain, the water itself may get so hot that it boils over. Did you ever have to stop to let the engine cool off before you went any farther? The body is very much like an automobile. When it gets really hot we feel very uncomfortable, and if we could not cool off we should die.

You are wondering now how the body keeps from getting too hot. The principal way in which it keeps cool is through perspiring. In the skin are little bodies called glands, which manufacture a liquid known as perspiration. You may be interested to know that these glands get most of this liquid, which is almost entirely water, from the blood. These glands are at work all the time, but they work harder than ever when the body begins to get too warm. The liquid is drained off from them through some tiny tubes, or ducts, to the skin. You know how wet your



 hands, face, and body may be on warm days or after you exercise hard. As this perspiration evaporates, it cools the skin. The body is such a wonderful machine that when it gets cool enough,



*A clean drinking fountain in the  
Abraham Lincoln School*

I take a drink nearly every time I go past the fountain. Do you?

the sweat glands slow down their work. In hot weather the body naturally perspires more than in cold weather. Do we need to drink more water in warm weather than in cold weather? Why?

Have you ever noticed that on cold, frosty mornings you can see your breath? It looks like fog or smoke. This happens because the moisture in your breath condenses, or changes to very tiny drops of water that we can see. From this we can tell that every time

we breathe out air, the body loses moisture. This moisture comes from the lungs. The lungs must be kept moist, therefore, or they will soon become inflamed and cause us much pain.

The body loses about four pints of water every day. If it is to do its work properly, and if we are to remain healthy, we must take into the body at least as much

water as the body loses. Much of our ordinary food, such as milk, soups, fruits, and vegetables, contains water. There is very little that we eat that does not contain some water, but in addition to the water we get in this way we need to drink at least four glassfuls a day.

We should get into the habit of drinking water whenever we are thirsty. It is a good plan to take a glass of water as soon as we get up in the morning. This helps the body to get rid of its wastes. Between meals water should be taken freely also. I seldom go by a drinking fountain without taking a drink. It was once thought that we should never drink water at mealtime. Now we know that it is all right to drink at our meals if we do not wash our food down with the water. Food should be chewed and mixed with saliva, because saliva alone, not water, will change the starch of the food into sugar.

That is all I have to say about water, but here is a note sent to me in care of Station HHS:

Would you mind my asking a question that may seem foolish? Just why do we breathe? I know that we must breathe in order to live, but just what does the air do for us? I can't find any answer that I can understand in any of my books. When I asked my Uncle Jim, he just said, "Why, anybody knows that if you didn't have air, you would die." I want to know why.

Peter





I am glad you asked that question, Peter. The talks given at this station before have told you that carbohydrates, fats, and proteins contain fuel material, and that such material can furnish energy which we need to keep the body warm and to think and move. Now an engine cannot move if it just has fuel. The fuel must be burned. That means that there must be a fire and a supply of the gas known as oxygen, which comes from the air. Notice that when you close the draft of the stove or the furnace, the fire dies down. If it is closed tightly, the fire may even go out. The engine that cannot get air, that cannot breathe, soon stops going. In the same way, the body must have air, for air contains the oxygen we need to help burn our food so that we can have a supply of energy.

Somebody will ask: "But where is the fire in the body? Where is the fuel burned up?" That is a hard question to answer. We know that the blood, as it flows through the lungs, sucks up, or absorbs, oxygen, from the air we breathe. This oxygen is carried to all parts of the body. When you use the muscle of your arm, food or tissue is being burned up. Notice that if you work a muscle hard it gets warmer. Nobody knows just how this takes place, but we do know that it happens, even if there are no flames as in a real fire.

You can see that our food would do us no good unless we could breathe. We must breathe in enough air so that the body will be well supplied with oxygen. Sometimes boys and girls have growths called adenoids in the back part of the throat and nose, which make it

hard for them to breathe. They may be pale and lack energy until these growths are removed by the doctor. Everybody needs to stand erect and sit erect, so that the lungs may have plenty of space to work.

I should advise you all to try to exercise and play in the open air. That makes you need more food, and it gives you a sharp appetite to enjoy your food. It's great fun to eat when you are really hungry.

In closing, let me say once more that water and air are necessary for healthy living. Get plenty of both. Good-by.



So ended the fifth broadcast to the W. T. R.

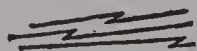
## THE HEALTH BULLETIN BOARD



•CORNELIA HOFF•

Isn't Egypt an interesting country? The inhabited part is long and narrow like a shoestring along the river Nile. Egypt has sometimes been called "The Gift of the Nile." Do you know why?

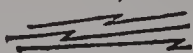
*Judith Leader*



Try these two tests. What do they show?

1. Take a mirror and blow on it. What do you see? What has happened?

2. Dry your mouth thoroughly with a clean piece of cloth. Then chew some dry crackers rapidly. Try to swallow. What is missing?



*Roger*

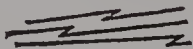
### *Three-Minute Talks for Our Discussion Period*

1. What difference the rainfall in our state makes in the kind and the amount of food we have.

2. Why we should form the habit of drinking plenty of water.

Can you suggest some more?

*Polly*



Copy these in your notebook and see if you can find the right word to fill each blank:

1. ----- of the body is water.

2. Plants and animals that cannot get water will -----.

3. Among the liquids of the body that are composed largely of water are -----.

4. One way in which the body is kept cool is through -----.

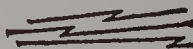
5. Breathing in air is so important that our ----- could ----- be used without it.



*Tom*

I read about an experiment to show how oxygen is necessary for "burning." Light a candle and turn a glass jar upside down over it. See what happens.

*Ethel*



Let us look in our geography books to see if we can find a map that tells us about the amount of rainfall in our state. Perhaps we may get such a map from our state department of agriculture. What do differences in rainfall do to food products?

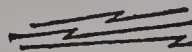
*Molly*





*School on an oasis*

From what I had heard about the Sahara Desert I never thought there were people who lived there. Imagine my surprise when I found this picture. What is an oasis? Why may we sometimes expect to find schools there?



*Jack*

For our history lesson Monday let us look up the story of the Black Hole of Calcutta. Does this teach you anything?



*Lenore*

I learned these new words in today's broadcast :

glands  
ducts

intestines  
adenoids

evaporation  
oxygen

*Mary*

## VII

### *The Body Needs Minerals*



Station HHS :

This is to tell you that I am enjoying the weekly talks from HHS very much. My mother is interested, too, and says that she wants to be with us at the next broadcast.

I am really writing you this letter to ask a question. We have some neighbors who take a tonic every spring. Not only do the father and mother take it, but also the children. They say that people are likely to be all run down in the spring and so need some kind of medicine that has materials called minerals, such as iron, in it.

My mother says that if we eat the right kind of food we do not need to take such tonics. She says that they should be taken only when the doctor advises. Perhaps in some future broadcast you will tell us about minerals.

Truly yours,

*Alfred Hayes*

[*This letter was read by Edward Sheehan in the sixth broadcast. Everybody in the W. T. Room wondered what Edward would answer.*] This was such an interesting letter that as soon as I received it I began to read all I could about minerals in our foods. I found I knew very little. Miss Green, who teaches a class in foods, told me a good deal, and I went to see Dr. Read, our family doctor, at his office, and he also helped me out. While Dr. Read and I were talking, we saw a boy with bowed legs crossing the street.

"Poor fellow," said Dr. Read. "There is a boy who has not had the right kind of food. That is the reason he is bow-legged."

"What has been the matter with his food?" I asked.

"It may have had too little of a mineral called calcium," answered Dr. Read.

Then I learned that because the bow-legged boy had not eaten enough of the foods that contain calcium, his bones had stayed soft and bent under him. I was glad that I had always had enough calcium in my foods so that my bones grew straight and strong. The doctor told me, however, that a lack of calcium in the bones is not always due to a lack of calcium in the food. The body cannot make use of calcium even when it is in the food, unless there is a sufficient amount of what is called vitamin D. You will learn later that we get vitamin D only when the sunshine reaches our skin or when we take cod-liver oil or viosterol or eat foods like egg yolks and vitamin D bread.





*Hello, friends!*

How many reasons can you give for the need of vitamin D? Where do we get this vitamin?

☀ The very next day I met Dr. Maller, our dentist. I told him about Alfred's letter and asked him whether he could tell me anything more about calcium.

"Indeed I can," he replied. "There are some boys and girls that are forever coming to my office. Their teeth are so soft that they are always decaying and needing to be filled."

I remembered what we had learned in school about cleaning our teeth after every meal, and so I said: "Well, probably they do not keep their teeth clean. If they did, then their teeth would not decay."

"In buying a shovel, should you prefer one of wood or of metal?" Dr. Maller asked me rather suddenly.

"One of metal," I replied, in surprise. "The wooden one would be so soft that it would soon wear out. A metal shovel, if it were properly taken care of, would last a lifetime."

"You are quite right," said Dr. Maller. "It is the same with the teeth. If they contain plenty of calcium and are therefore hard, they will last many years, probably a lifetime, if well cared for. If they lack calcium and are soft, they will soon come out and false ones will have to take their place."

I know that you are now leaning forward in your seats with the question, What kind of food should we eat to get this calcium into our bodies? Milk is especially rich in calcium, and every child should drink about a quart of it each day. Other dairy products, such as ice cream and cheese, also contain calcium.

Fruits, especially oranges, vegetables such as carrots and turnips, cereals, and eggs are rich in calcium. Every boy or girl who drinks a quart of milk each day and eats a fair amount of fruit, vegetables, and eggs will get enough calcium for his or her needs.

We boys and girls, who are still growing rapidly, need three or four times as much calcium as our parents. We must have plenty of bone material.



*Escarole*

This beautiful leafy vegetable is served every school day at the Chew-Chew Inn as greens or in a salad. Do you ever ask for it in your school cafeteria? Some day when you go marketing with your mother ask her to get some escarole





Calcium has many other uses in the body besides helping to build bones and teeth. You all know that when you scratch or cut your finger until the blood flows, the blood finally thickens in a clot and the bleeding stops. Calcium in the blood has much to do with this. Often, before a doctor removes tonsils, he tests the patient's blood; and if he finds that it does not clot quickly, that is, that it does not contain enough calcium, he sees to it that the patient takes enough of this mineral into his body before the operation to help check the bleeding.

Another mineral that the body needs is phosphorus, which also helps to build and repair the bones and the teeth. It is also needed to help form many of the body fluids, such as the saliva. When saliva contains a rich supply of phosphorus and calcium, it protects the enamel of the teeth against decay. Phosphorus is found chiefly in eggs, milk, cheese, meat, vegetables, almonds, fruits, whole-wheat cereals, molasses, and maple sirup.

Let me tell you next about iron. Iron is so necessary for the blood that if there isn't enough of it in our food, we soon get pale and weak, or, to use a big word that Dr. Reed used, anemic. Probably you did not know that it is the iron in the blood that helps to make it red.

I was surprised to find out that the liquid itself of the blood is not colored. In fact, it is almost without color. But in the blood stream there are some little bodies, or cells, called red corpuscles, containing a substance, or material, rich in iron, which readily takes



up oxygen. The tiny tubes, or canals, that carry the blood are called blood vessels. The blood flowing in them through the lungs is separated from the air which has been breathed in, by the very thin walls of the blood vessels. Oxy-

gen from the air passes through the thin walls and is taken up by the corpuscles of the blood.

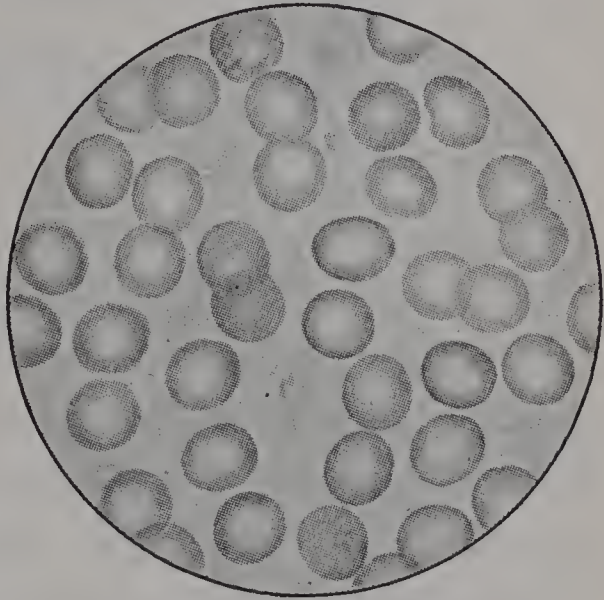
These corpuscles carry the oxygen through the tiny little blood tubes to the muscles that need it if they are to move. You

can see that no matter how much air you breathe in, it will not do you any good unless you have this substance containing iron in your blood to carry the oxygen from your lungs to all parts of your body.

We must have iron in the

blood, or the little ships, the red corpuscles, cannot take on a cargo of air which contains oxygen.

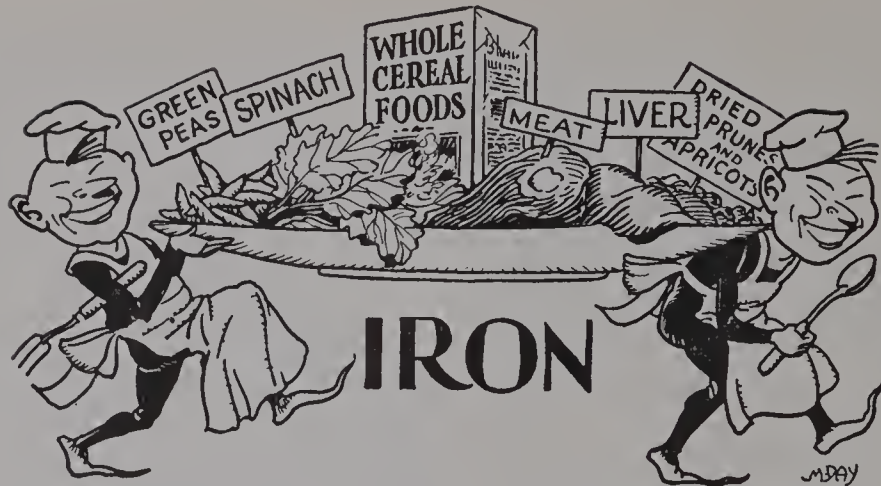
Children who are pale, lifeless, and dull may not be getting enough of the foods that have iron. They should eat more of such common foods as egg yolks, whole-wheat cereals, beans, spinach, prunes, peas, and liver, which are well supplied with iron.



*Red corpuscles*

There are millions and millions of these little bodies in the blood. They are formed in our liver, spleen, and bones. Each one lives about three weeks. Old ones die every day, and new ones are formed. What is the work of these corpuscles? What happens when we do not have enough? How may we increase the number in our blood?





*Why shouldn't we be jolly?*

We serve good foods



Since children are growing rapidly and since their blood supply is increasing very fast, they have a great need of iron. Milk, which is one of the best foods for children, is low in iron; so nature does all it can to supply this lack in another way. At birth the baby has a reserve of iron which the body can use stored away in the liver. Even so, most doctors tell mothers to include egg yolks and vegetable waters in their babies' food as early as possible. In the last few years it has been found that people suffering from anemia, or, in other words, who are anemic, may be helped by eating large amounts of liver. The iron which is so needed is found in liver.

Now, to Alfred's question about getting your iron in a tonic. Dr. Read told me that if people ate the right kind of food, they would usually get all the iron and other minerals that their bodies need. It is never wise to take any medicine containing iron unless the doctor advises it.

Now, I may have a surprise for you. All of you know something about iodine. You probably keep it in your medicine cabinet for scratches or cuts. It helps them to heal quickly. But you may not know that unless you have iodine enough in your body, you cannot be healthy.

Reaching across the neck under the lower jaw there is a gland called the thyroid. It manufactures a substance containing iodine which is turned into the blood and which does something to the whole body. The thyroid is like the accelerator of an automobile. The harder you press your foot on the accelerator, the faster the car goes. If you take your foot off, the car will slow down and finally stop. When the thyroid turns into the blood the right amount of its product, everything goes along well. When it turns too much of this substance into the blood, the heart beats faster, breathing is quicker, food is used up more rapidly, and the bodily reserve supply of fat disappears. The body becomes like an engine which has been raced until it is almost worn out. The person grows tired and nervous. If the thyroid turns too little of this substance into the blood, the body slows down and the person becomes dull, idle, and fat. If the thyroid does not have enough iodine, it may gradually increase in size and form a goiter. We get much of our iodine from our drinking water. In those parts of the country where there is little iodine in the water, goiter is common.

Near the sea there is a good supply of iodine. Sea plants and sea fish are well supplied. Oysters,





clams, crabs, lobsters, and other sea foods are therefore very much to be desired. The custom of having fish or some other kind of sea food on at least one day of the week is excellent. In some places where there is little iodine in the water, health departments recommend the use of salt which has iodine in it. Iodine is sometimes put into the regular water supply. In Switzerland, where goiter was once a common disease, children are given regularly a bit of chocolate which contains some iodine. This has checked goiter in that country.

In closing let me say that usually it is the best plan to get the minerals that you need by eating the right kinds of foods. Do not depend on drugs. Use them only when the doctor advises it.

*[Immediately afterward there was the familiar voice, saying:]* Boys and girls, this closes our sixth broadcast. I hope you have enjoyed it.

Next week we shall learn some more things about foods that may be quite new to some of us. The broadcast will be about vitamins.

Good-by. This is Marian Hall announcing from Station HHS.



"That was one of the best talks we have had," said Robert. "I never knew before that we need iron, calcium, phosphorus, and iodine so much. Let's look at Chew-Chew Inn's menu for tomorrow to see how

many foods on it have iron in them. I wonder whether celery has iron in it. I will try to find out."

## THE HEALTH BULLETIN BOARD

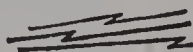


CORNELIA HOFF

Here are some of the high points that I got from the broadcast "The Body Needs Minerals" and from my reading:

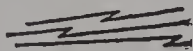
1. If you eat the right kinds of foods, you seldom need to take a tonic.
2. The blood needs iron to enable it to carry oxygen. We must have oxygen to move and think, — in fact, even to live.
3. Calcium and phosphorus are needed for bones and teeth.
4. Fish and other sea foods contain iodine.

Can you think of other points to write in your notebook?



*Arthur*

How many fruits and vegetables can you name? I have a long list of both. How many can you check that you eat regularly?



*Catherine*

I learned these new words today:

calcium    anemic    phosphorus    thyroid    accelerator

Are you collecting words for your vocabulary?

*Lenore*

## VIII

### *A Salad a Day*



GOOD morning, boys and girls. This is Station HHS, announcing again its Thursday-morning health talk. I have another letter to read this morning from one of the unseen audience. Here it is:

To Station HHS:

I am much interested in your health talks. I learn something new every time I listen to one of them, and I am trying to do and practice what we are told, so that I may grow up to be strong and happy. Perhaps you can explain something that I do not understand. Today at dinner my father and mother had an argument about eating vegetables. My father does not like salads. He says that cabbage, celery, and lettuce have little nutrition. He believes salads will not make muscle and supply energy. Is that true? If so, why do so many doctors advise us to eat such vegetables?

Very truly yours,

*Thomas Brown*



This is a very interesting letter, and I have asked the speaker of the morning to answer it. Let me introduce Marjorie Snow.

[*Marjorie began:*] Boys and girls, I am eager to try to explain this matter which Thomas has brought up, for I am very fond of salads, and I think they help to make one healthy.

To begin with, I'm afraid Tom's father is mistaken. There *is* nourishment, or food value, in vegetables like cabbage, celery, and lettuce. Vegetables contain carbohydrates, the energy, or "go," foods; while eggs contain fats and proteins, the heat and "grow" foods. Each has its place in the diet. We eat vegetables for one reason and eggs for another, but both are necessary. We must remember that the right amount of calories alone in our food is not enough for good health. Tom's father has overlooked the vitamins, the mineral salts, water, and other materials in salads, so necessary for good health.

In the radio talks that will come later, you will learn about these valuable things called vitamins; but let me mention this fact now. Recent nutrition experiments, or experiments with foods, have shown that the vitamin known as vitamin B helps to strengthen the muscles of the walls of the intestines, and so helps in the removal of waste. Without the help of this vitamin B the action of the intestines is likely to be lazy or weak.

Fruits and vegetables, which go to make up the majority of salads, are rich in vitamin B.



Let me go on with the second half of my story, which will tell you why salads are so important in our daily diet. Many things that we know are made of a material known as cellulose. Ordinary wood is made of cellulose, and so are paper, linen, and cotton. Vegetables and fruits are made up largely of cellulose. Cellulose cannot be digested. It does not make muscle or bone, nor does it furnish energy. The question that comes to our minds right away is, Why should we fill our stomachs with such material if we cannot digest it?

You all know that after the food leaves the stomach it passes into a long, narrow tube called the intestines. As it goes along through this tube the parts of the food that the body can use are absorbed, or taken up, by the blood. What is left must go the full length of the intestines and finally be thrown off by the body. If it stays too long in the intestines, the poisons, or waste products, that it has in it may be absorbed into the blood and cause headache and more serious illness.

Now, this is the important point about food containing cellulose. When such food is in the intestines, the muscular activity of the walls of the intestines is increased and the food is squeezed in such a way that it is forced along. Vitamin B, contained in salads, is responsible in large measure for this activity. Liquid food like milk, valuable as it is, or lean meat, which is finally dissolved into a liquid, is not able to make the muscular walls of the intestines work.



*An excellent lunch*

This girl is eating lettuce and tomato salad with mayonnaise dressing. She also has a glass of milk and bread and butter. Do you think this is a nutritious lunch? Why?

I think that everybody in this class sees now how necessary it is to eat salad foods. They are sometimes referred to as "scrubbing brushes," because they tend to keep us clean inside. Those who eat plenty of vegetables and fruits, drink plenty of water, and form the habit of going to the toilet regularly are doing a great deal to keep themselves healthy.

If you are not in the habit of eating vegetables and fruits, it is a habit you ought to form. Beets, cole-sl原因, or chopped cabbage, celery, cauliflower, lettuce, and tomatoes are some of the important





salad vegetables that contain cellulose. Many of the fruits have it, figs and dates particularly.

When used with salad dressings made up principally of fats, vegetable and fruit salads possess real nutrition value and are equal to many other foods of supposed greater food value. I wonder if Tom's father knew that? Vegetable and fruit salads contain also many valuable minerals which are needed by the teeth, bones, and blood. So salads are very important for health. I wish that some day toward the end of this school year our chairman could tell us that every boy and girl in this audience was eating at least one salad a day.

Some people take out sickness insurance. When they get sick, the insurance company pays them so much a week until they are well. This is a good plan, but of course nobody wants to be sick even if he does receive a little money. It is better to live so that we shall not be sick. Learning to eat fruits and vegetables is one kind of insurance against sickness. It is an insurance for good health.

Remember these very important reasons why a salad should be included in our meals at least once a day :

1. They make a dinner attractive by furnishing color, variety, and flavor. Most salads are not only pretty to look at but, since they may be made from fruits, nuts, vegetables, and meats, are pleasing to the taste as well. Anything that makes a meal attractive aids the digestion.

2. They contain cellulose, which, although indigestible in itself, is necessary for good digestion.

3. They may contain raw fruits and vegetables, which we must have to be healthy.

4. Salads often contain foods having fuel value; as, cheese, chicken, oil, bacon.



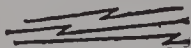
In her usual way Marion closed the broadcast. She praised Marjorie Snow for her talk about salads. She said that the next radio address would be on one of the vitamins.

## THE HEALTH BULLETIN BOARD



• CORNELIA HOFF •

Mother was so much interested in our talk about salads that I took out my notebook and read my notes to her. She says I may plan to make the salads for dinner all next week. I am going to make a salad tonight out of chopped apples, raisins, nuts, and lettuce. Mother is very much interested in the salad recipes I am collecting.



*Lucy*

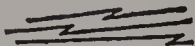
Marjorie's talk was so convincing that my father has been won over to salads. Now we have a different one every evening, and father is telling all his friends how much better he feels since he started the salad habit.

*Thomas*

cellulose

insurance

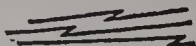
How many new words have you collected thus far?

*Arthur*

Who can give me a recipe for a good French salad dressing? Why is it better to use lemon juice in place of vinegar?

*Theresa*

I suggest that our printing shop get out copies of Marjorie's talk on salads, to be sent home to our mothers and fathers.

*Dave*

I had celery for dinner last night. When I broke a piece, I saw why it can be called an "internal, or inside, scrubbing brush." Experiment the next time you have it.

*Matilda*



## IX

### *Solving a Mystery*

THIS morning," said Tom, "I heard mother tell my sister that she must be careful to cook the beet greens in a small amount of water. 'When they are cooked,' she added, 'the water should be almost boiled away, and what little liquid there is left we should drink, because in that way we shall get more of the minerals and vitamins that the greens contain.' I read in a book on foods that beet greens have iron, which, as we learned last week in our broadcast, is necessary for the red corpuscles. I also found that these greens have vitamins A, B, and C. When I asked sister what vitamins are, she couldn't tell me very well, but she knew that we must have them to be healthy. She also said that cooking and exposure to the air destroy some of the vitamins. I am glad we are to hear more about them."

"It's time now," said Robert, as he stepped to the radio. There was a buzzing sound. "It seems to be hard to tune in," he said. "Ah, here we are!"



This is Station HHS broadcasting its weekly health program. You are to learn today about some very



wonderful discoveries concerning food and health. You have all heard your mothers speak of vitamins, and you will remember that last week's speaker mentioned them in her broadcast. Today we are to hear more about them. I have the honor of presenting to you Miss Helen Sobol.

[*The next voice was that of Helen.*] Good morning, boys and girls. I understand that you are all fond of stories; so this morning I shall start in to tell you an interesting story about foods.

As scientists went on with their studies of foods they began to wonder whether all fats are alike or not. So they decided to test fats, and for the testing they secured a number of young animals. They tried to make young rats grow on diets that seemed to have all the things necessary for growth,—carbohydrates, proteins, fats, water, and minerals. One group of rats was fed on what seemed to be a good diet, but a diet whose only fat was lard. It was found that after 100 days the rats made little or no gain in weight. As soon as whole milk was given them in place of the lard, the rats started to gain, and gained steadily until they were full grown. Another group of animals was fed on what looked like a good diet, but a diet which had no fat except that found in lard and olive oil. This second group, like the first, made almost no gain after a period of 100 days. As soon as they were fed butter or the yolk of egg, however, they too began to grow. Apparently all fats were not alike. Here was a real mystery.

These tests and others like them showed the scien-

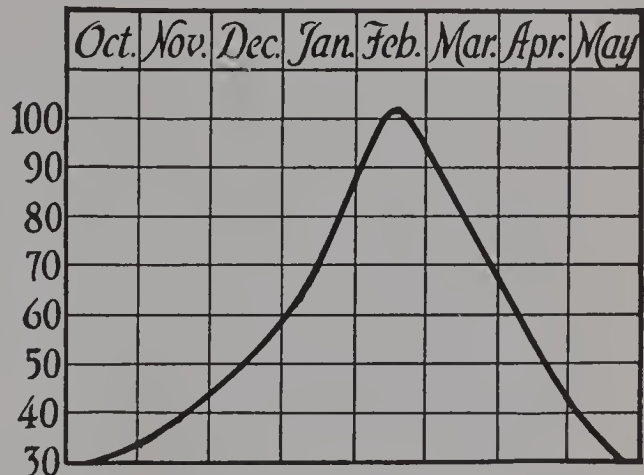
tists that there is something in the fat of milk, butter, and egg yolk not found either in such animal foods as lard or in such vegetable foods as olive oil, and that animals have to have this certain something in order to grow. It was not possible to find out what this substance is even with a microscope, but the scientists called it vitamin A.

Whatever a vitamin is, it is very real.

During the World War it was so hard to get the right kind of food and enough of it that the people in various countries suffered severely. The effect of the lack of vitamin A was shown in a striking way in Rumania.

When the Austrians

swept into that land, they drove away or killed all the dairy cattle, so that the Rumanian babies could not be given any milk. Even canned milk was not to be had. The diet was limited to bread and soup. The lack of vitamin A soon led to eye troubles. Relief came in an interesting way through an American scientist with the Red Cross, who secured a supply of cod-liver oil, which was known to be rich in vitamin A. After the cod-liver oil had been given to the babies for a time, the eye troubles began to disappear rapidly.



*When colds increase and decrease*

During what months are colds most frequent? Can you give any reasons why? During the dangerous months it is wise to get more sleep and rest and eat nutritious foods







Although it is a mystery just what vitamin A does, we know that we must have it to be healthy. A lack of it not only affects the eyes; scientists have also found that when animals do not have foods that contain this vitamin, they may have soreness in the ears and nose, and diseases of the lungs. Vitamin A gives us vigor and helps us to grow and increase our appetite. Children need vitamin A to grow.

Among the foods that are rich in vitamin A are

Whole milk	Tomatoes
Butter	Sweet potatoes
Cream	Turnip greens
Cheese	Pineapples
Egg yolk	Prunes
Spinach	Liver
Raw carrots	Cod-liver oil and other fish oil

The next thing that was found out about vitamin A was that colored foods seem to contain more of it than colorless foods do. Sweet potatoes have a greater amount of that vitamin than white potatoes; yellow corn is richer in it than white corn; and carrots are richer in it than parsnips. The outer green leaves of lettuce are richer than the inner whiter leaves. Scientists undertook to find out why. They took from carrots a yellow substance called carotin. They then began again to experiment with rats. When the rats had been fed for a long time on food that was free from vitamin A, they stopped growing and began to have sore eyes. Then they were fed small doses of carotin daily, and their eyes began to clear up. They

behaved as if they had had vitamin A. The scientists concluded that the carotin had led the body to manufacture its own vitamin A.

When the body gets more vitamin A than it needs, it may store some of it in the liver for future use.

Vitamin A is one of the vitamins that may be destroyed by gradual cooking if the food is uncovered. It is better to can vegetables by cooking them in sealed cans than to cook them first and then put them in cans.

Now I know that many of you are eager to find out just how we can be certain of getting enough of this important vitamin. One



*Chayote*

This new tropical vegetable is rich in vitamins

of the best ways is to get enough milk every day. The cow eats large amounts of grass and other vegetable material. Many of the vitamins that she takes in are carried to the milk. If you use about a quart of whole milk, not skimmed milk, and leafy vegetables every day, you need not think any more about vitamin A.

My watch tells me that it is time to bring my talk to a close. I know that you will be glad to hear about the other vitamins in the broadcasts to come. The story about the next one is especially good.

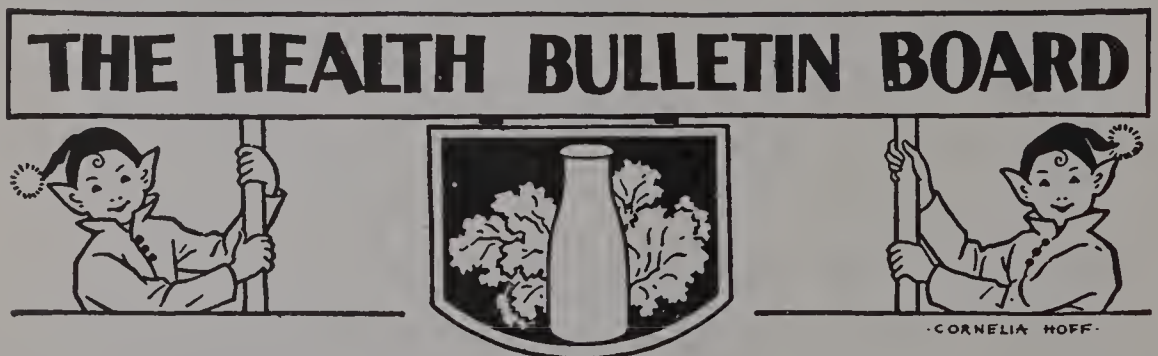


[*Marian's voice was then heard:*] Boys and girls, you have been listening to the weekly broadcast on health from Station HHS. This is Marian Hall announcing.



"That was an interesting talk," said Peter. "It seems as if milk contains about everything. I do not drink enough, I am sure. Tomorrow I shall begin to have a glass of milk every day for lunch."

"Yes, and I shall have a glass at every meal," said Mabel. "It is interesting, isn't it, that the cow is a kind of factory for changing everything that she eats into fats, proteins, minerals, and other things that make boys and girls healthy? Let us write a verse about milk. See who can make up the best one."



Aren't vitamins queer things? Did you listen thoughtfully to the radio talk on vitamin A? If you did, you will be able to tell whether each of these statements is true or false:

1. A vitamin may be weighed.
2. Foods that provide energy, warmth, minerals, and building material contain all the body needs to be healthy.
3. Vitamin A protects one against certain illnesses.



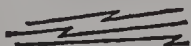
4. Dairy products are rich in vitamin A.

5. Vegetables with color have more of vitamin A than those without color.

6. Carrots contain vitamin A.

7. Lard contains as much vitamin A as cheese.

*Philip*



During the World War, Holland made money by shipping milk, butter, and cheese to the countries at war. What difference do you think this made to the Dutch babies?

*Margaret*

Are there any canning factories near our school? Let us plan a visit to one.

*Charles*



I added three new words to my vocabulary:

scientist

carotin .

vitamin

Is your list growing bigger?

*Gloria*

## X

### *Two Health Heroes*



BOYS and girls, this is Station HHS, broadcasting its weekly health program. Our speaker this morning will tell us other interesting stories about the vitamins. The first story today starts with the Far East. May I present Miss Barbara Bohner?

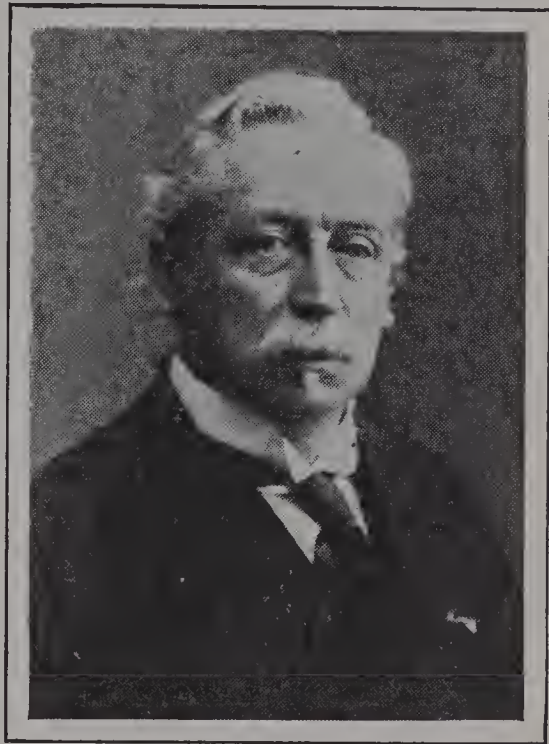
[*Barbara Bohner spoke:*] Good morning, boys and girls. We are all fond of rice, but I'm sure most of us have never paid any special attention to it. I wonder how many of us know that to the people who live on rice it makes a difference whether they eat rice with or without the outer skin around the kernel.

In the lands where people have lived largely on rice, there has always been a disease by the queer name of *beriberi*, which means "cannot." People with this sickness just cannot do anything; they are too sick. They lose their interest in food. They no longer have an appetite. They fail to grow as they should; they get weak, and finally become paralyzed. If you will look at a map showing the areas where rice is produced, you will see that most of it is raised in the countries of the world which have the most people; and for

that reason it is possible for many, many people to have this queer disease.

But it was a long time before people knew that eating rice had anything to do with beriberi. The first hint that it did came unexpectedly from the work of a Dutch scientist, Dr. Christian Eijkman, in Java in 1889. He had been experimenting with poultry to find out about different kinds of foods. He was puzzled with the results. Although the chickens had been fed on a fixed diet, rice, their health was very changeable. For a time they died so fast that he thought he would have to stop his experiments; then they were better; and then, after a time, worse.

One day Dr. Eijkman found out the reason why. It was one of the duties of his native boy to buy the rice for the chickens. The boy was given the money for this purpose. But instead of buying the rice, he had been begging it from the hospital steward, the man who provided and distributed the food, and pocketing the money himself. The grain that was given him happened to be polished rice. Then the steward went away for a time, and the



*Dr. Christian Eijkman*

The famous Dutch scientist who discovered vitamin B





*Map showing rice areas of the world*

Each dot on the map stands for 100,000 acres of rice. In what countries is most of the rice of the world raised? Is any raised in America? What is its chief value as a food? What does it lack? What do we need to eat with it? How may beriberi be prevented?



boy was forced to buy the rice. It was during this time that the chickens recovered and were in a healthy condition. When the steward returned and the boy went back to begging his polished rice, the chickens again grew sick and died. The illness of the chickens seemed to be like the human disease beriberi. It was now evident to the doctor that there was a strange force in the outside layer of the brown rice.

So Dr. Eijkman decided to feed some unpolished rice, which had been thought unfit for human beings, to certain beriberi patients. The hospital doctors took very little interest in the experiment; but, to their surprise, the patients recovered. Dr. Eijkman had made one of the most interesting discoveries in science. Further proof that he was right came when study showed that beriberi was not found in those




*Rice terraces in the Philippines*


In many places among the mountains of the Philippine Islands it is hard to find land for the raising of rice. The natives build these terraces up the mountain sides. They also have remarkable systems of irrigation

regions where people were too lazy to shell their own rice. For at least once laziness was richly rewarded.

We now know that berberi is caused by the lack of what is called vitamin B. This vitamin is not found in the kernel of the grain of rice, but in the outer covering. It is now possible for all peoples living in the Far East to get rid of this dreaded disease. All they need to do is to eat unpolished rice and a varied diet of vegetables and fruits.

During the early days of the late war, before the United States had entered the fight, a German submarine came into Hampton Roads, Virginia, 



 one day with a cargo of foreign drugs for American use. There were scarcely enough healthy sailors on board to man the ship. The hold was filled with canned foods, but there was no fresh food. The crew were having the experience of many other sailors in war. They were suffering from beriberi.

Here in America we seldom have beriberi; but we do sometimes have stunted growth, weakness, lack of appetite, and general ill health, and they are often due to the fact that children and adults are not having enough of the foods that contain vitamin B. Since this vitamin is in so many foods, it is rather easy to get enough of vitamin B. We really need very little of it. These are the foods that are rich in vitamin B:

Vegetables, such as Asparagus, Beans  
Leafy Vegetables, such as Spinach and Raw Cabbage  
Fruits, especially Tomatoes  
Whole-Wheat Cereals  
Kidney and Liver

Vitamin B is not found in any kind of oil, white flour, starch, sugar, or muscle meats. Foods left open to the air or cooked in an ordinary way do not lose this vitamin.

I have said so much about rice that probably some of you would like to know more about it. Here is a chance to look it up in your geography books.

We also know that vitamin B is necessary in our diet to regulate the action of the intestines. Marjorie told us about that in her talk on salads. There is so little vitamin B in milk that in the feeding of babies we now add some to their diet. When given to infants



that are not growing well, vitamin B has been found to improve their appetite. This leads them to take more food, and so they gain weight.

Do you know, classmates, that I had always thought it didn't make much difference what a person ate, so long as he had what he wanted? Now I know that such an idea was wrong. Among those to whom I owe my change of idea is Dr. Joseph Goldberger, one of America's famous scientists, who found that a disease called pellagra could be prevented and cured by eating the right kinds of foods. He helped to discover the vitamin now called vitamin G, which is in those foods.

Pellagra up to a few years ago was common in those states south of the Ohio and Potomac rivers. It was even one of the foremost causes of death in some of the Southern states. At first it was thought to be infectious or contagious, like diphtheria and smallpox, or to be carried by insects, as in the case of the disease known as malaria. It was finally found to be due to an unbalanced diet. I think we are to hear more



*Dr. Joseph Goldberger*

A great scientist and brave man who taught us that the right kind of food will prevent a disease called pellagra



about that later. Miss Leader says that a balanced diet is a plan of nourishment that provides for enough of all the things necessary for good health. The continued lack of any one vitamin or mineral, such as iron, may cause illness or even death. After long and patient work Dr. Goldberger and his faithful helpers found that the disease was common among those who were poor and lived largely on white flour, pork, and molasses. During years of plenty the disease grew less, but it returned with hard times. Prisoners from the Georgia state prison, who were offered their freedom if they would help in Dr. Goldberger's experiment by eating whatever the doctor wished, began to show signs of pellagra after they had been fed for about six months on foods made largely from ordinary white flour. They were then restored to health by a well-balanced diet.

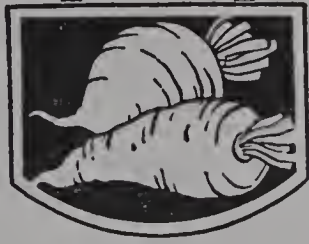
The work of Dr. Goldberger showed that the best foods to prevent pellagra are milk, spinach and other leafy vegetables, fresh fruits, lean meat, and yeast.

As I learned more about Dr. Goldberger I found that he was a brave soldier in the fight for good health. In doing his work he became seriously ill with fever three times. I believe he will be long remembered by a grateful people. Through his work pellagra promises to disappear.

After all, what we eat does make a difference. Isn't it worth thinking about?



# THE HEALTH BULLETIN BOARD



CORNELIA HOFF

How many of these questions can you answer?

1. Although we eat rice in America, we do not have beriberi. Do you know why?

2. How did Dr. Eijkman discover vitamin B?

3. What happens to people in our country who do not get enough of this vitamin?

4. Why are babies sometimes given vitamin B?

5. What foods are richest in vitamin B?

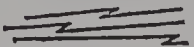
6. Who discovered vitamin G? Tell the story of his discovery.

7. What foods help most to prevent pellagra?



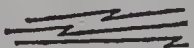
*Judith Leader*

I have the story of three health heroes in my book. How many have you? Who are they? I am planning three more.



*Joseph*

Yeast is the most concentrated vitamin B substance known; that is, it contains more vitamin B than any other material known. Yeast depends upon this vitamin for its tonic effect on the intestines. Have you ever tasted yeast?



*Alice*

My vocabulary has been increased today with three new words:

kernel      beriberi      pellagra      unbalanced      *Ira*



## XI

### *Fresh Raw Food is Necessary!*

GOOD morning, Miss Leader."

"Good morning, Nancy."

"Miss Leader, this is my mother. She would like to visit our room this morning. Every time we have had a broadcast I have taken my notes home and told mother all about it. She has become so interested that she wants to hear one of the broadcasts herself."

"Welcome to our class, Mrs. Jones!" said Miss Leader, extending her hand. "We enjoy having parents come. I think the broadcast is about to begin. Won't you be seated?"

"Yes, thank you," said Mrs. Jones.



Good morning, boys and girls. This is Station HHS. I know you are waiting patiently to hear more about those queer substances called vitamins. The story about vitamin C is full of interest. I know you are going to enjoy it. May I present Robert Graff, who will tell it to you?

[Robert began to speak:] It has been great fun to read about vitamin C. The story of this vitamin centers around a curious disease that we do not hear much



*An attractive fruit and vegetable store*


This store supplies fresh fruits and vegetables the year around. Do you buy your food at a clean store?

about today, — a disease called scurvy. Probably most of you never heard the name before; but if you were to ask your family doctor about it, he could tell you a great deal about the disease.

People who had scurvy became very restless, tired easily, grew pale, and lost their appetites. Their mouths and gums became so sore that they bled. Sometimes they had loose teeth.

It took a long time to find out what caused scurvy, but now we know that it was caused by a lack of fresh raw foods. Scurvy used to be very common among sailors. You have read in your histories about the days of sailing ships. It took weeks and often months for



 them to cross the ocean. As men who lived on the sea did not know much about the value of fresh fruits and vegetables, their ships were not well supplied with them. Sometimes for weeks they would be at sea with nothing to eat but salt fish, meat, and hard-tack or other kinds of bread. Often they sickened and died. My great-grandfather crossed the ocean in a sailing ship back in 1830. He was on the ocean six weeks. My mother has his diary at home. When his ship finally reached America, over a third of the passengers and crew were ill. The suffering was very great.

How different is a voyage at sea today! Last summer my family went to Europe. We took almost the same route that my great-grandfather took more than a hundred years ago, but we were on one of the swiftest ships afloat. It took us less than a week to go across. What wonderful food we had on board ship! At every meal there was a chance to have fruits and vegetables. Usually I had an orange, a grapefruit, or a piece of melon for breakfast. For luncheon we could always have celery or fresh fruit. Usually we had fresh fruit for dinner. I do not need to tell you that there was no scurvy on board our ship.

In olden times, when armies tried to force the surrender of castles and walled cities by surrounding them and shutting them off from the rest of the world, the people who lived in them often fell ill with scurvy. Since I have been reading about fresh fruits and vegetables, I have thought of the castles we saw in Europe last summer. These castles were built on high ground,





*A castle on the Rhine*

It was difficult to capture one of these great castles, but sometimes they were forced to surrender because of a lack of fresh raw food. Will anything take the place of fresh food? What happens when it is lacking? What fresh raw food do you eat every day?

frequently at the top of a hill or mountain. Their high walls, great towers, and strong gates made it almost impossible to take them by force of arms. Because of this the brave knights in the castle were well able to defend themselves. There was one foe, however, that always gave them a merry battle. That foe was a lack of fresh uncooked food. Usually the castle-dwellers had a deep well which supplied them with enough water to last during the long struggle; there was also enough grain stored away; but there was no place within the castle walls for growing fresh fruits and





vegetables, and the supply on hand was soon used up after the enemy appeared. Gradually the soldiers protecting the castle fell ill, although they had plenty of food, until there was almost nobody left to man the walls. Then the castle was taken.

The arctic explorers also have to fight scurvy. This was especially true of the early explorers. It took a long time to sail to an extreme northern point, make ready to leave the ship, and then with dogs and sleds make a dash through the ice and snow for the pole. Fresh food could not be found in the country itself, and the supply which the explorers had brought with them was soon used up. Suffering from scurvy sometimes made it impossible for the explorers to go on.

How different was the journey of Admiral Byrd! His ship's stores were so well provided with fresh fruit and vegetables that his crew and the members of his company were kept in excellent health. Every explorer today sees to it that his men have fresh raw food.

For centuries people had scurvy and nobody seemed to know the reason. Gradually it became known that scurvy could be prevented and usually cured by eating fresh fruit and vegetables. Some of the Indians seemed to know about this even before the white men. In 1536 Cartier, the French explorer, was forced to spend a winter near the Gulf of St. Lawrence. Many of his crew died from scurvy. Those who recovered and finally reached home had taken the advice of the Indians of the vicinity and had made a drink from the bark and leaves of the spruce.

To make sure that scurvy was caused by a lack of fresh food, scientists again experimented with animals. They gave these animals plenty of excellent food but no fresh food. They found that the animals soon developed scurvy, but that they recovered when given fresh food.

When fruits and vegetables are cooked in the presence of oxygen or air, they gradually lose their vitamin C. Raw cabbage has twenty times as much of this vitamin as cooked cabbage. If vegetables are cooked whole with the skins on, they will keep more of vitamin C than when they are pared and cut up before they are cooked. Baking soda should not be used in cooking vegetables, since it destroys this vitamin. The amount of vitamin C in cooked tomatoes is much more than in other cooked vegetables. Vegetables that become tender in a short time, such as young peas and carrots, do not lose much of vitamin C. Modern methods of canning in a vacuum tend to preserve vitamin C. Why?

There is such a small amount of vitamin C in ordinary cooked food that everybody should eat some raw fruit or vegetables every day. The fresh foods that are richest in vitamin C are

Tomatoes	Oranges	Raw cabbage
Raw young carrots	Lemons	Lettuce
Raw green peppers	Grapefruit	Celery
Potatoes	Tangerines (a kind of oranges)	

The older the vegetable, the less vitamin C it contains. Thus young carrots have more than old carrots. Of what young vegetables are you fond?





This brings me to the end of my talk. I expect that all of you will want to eat some raw fruit or vegetables every day to be healthy. Good-by.



"That was a good talk," said Alfred. "Who ever thought that food had anything to do with history! It's strange that our history books say so little about it. I have always liked fresh food. Now I shall be especially careful to eat some every day. I saw the grocery man delivering some tomatoes at our house. We shall probably have lettuce and tomato salad for supper."

"Miss Leader," said Tom, "if heat or exposure to air kills vitamin C, I should think pasteurized milk would be bad for babies."

"I know something about that," said Carol. "We have a new baby at our house. Mother gives him a little orange juice every day. She says that keeps him well."

"Does that mean that pasteurized milk is harmful?" asked Tom, looking over to Miss Leader.

"Not at all, Tom," she said; "pasteurizing milk protects us from illness. All the milk we use in school is pasteurized. We would use no other. I know of one town that did not use pasteurized milk. A very severe epidemic of sore throat broke out there, and many persons were seriously ill. This never would have happened if the milk had been pasteurized."

"When milk is pasteurized, it is heated, as you know, and most of its vitamin C is destroyed. But vitamin C is in so many other foods that that's not serious. Little babies, however, who live entirely on milk, must have fruit juice to get the vitamin C which is lost in pasteurization."

"Miss Leader, I know of people who eat very little fresh fruit and vegetables, especially at certain times of the year. Why don't they get sick?" asked Alice.

"That's a good question," said Miss Leader. "Although today few people in our country really have what may be called scurvy, yet in late winter and early spring some of those who do not get enough fresh food have soreness of the joints, loose teeth, bleeding gums, and headache, and get tired very easily.

"One thing is certain," continued Miss Leader, "nobody can live without vitamin C, and it's easy to get. All we need to do is to be sure to have some fresh raw food in our diet every day."

## THE HEALTH BULLETIN BOARD



Here are some of the thoughts I got from the lecture on fresh raw foods. I am putting them on the board so that we may talk them over. Then perhaps I shall add some more to them before putting them into my notebook.

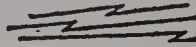
It is a good thing to cook certain kinds of food. I

should not care to eat raw fish, as the Eskimos do, should you? I like my fish broiled or baked. But everybody needs some fresh raw food every day.

People that do not get fresh raw food develop scurvy. This disease is not common today, because nearly everybody gets some kind of fresh raw food. Even if we do not have scurvy, we cannot expect to be in the best of health unless we eat enough fresh raw food.

I am pasting into my notebook pictures of lettuce and other foods that may be eaten raw.

*Mary*



Let us try this for a class cheer:

How do you like your vegetables? Raw, raw, raw!

How about your fruits? More, more, more!

Health, success, and happiness for our room,

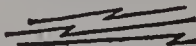
"Work Together," "Work Together!" Sis, bah, boom!



*Ethel*

I read in our *National Geographic Magazine* about the Byrd expedition. May we have a radio talk on what was needed for feeding the men?

*Marcia*



I learned two new words today:

scurvy

pasteurize

*Harry*



## XII

### *The Up-and-Coming Vitamin*

MISS LEADER, may I show you my notebook?" "Indeed you may, Charles. How neat and clean it looks! I wonder what it says about our last broadcast. Oh, yes, here it is. What does it say?"

I liked the last broadcast very much. When I thought about the food I ate, I found that there was much good fresh food that I was not eating. We have fresh ripe tomatoes on the table every day, but I have never liked tomatoes. I have been eating a little tomato every day since the broadcast, and I think I may learn to like it.

"Oh, Miss Leader, I have something interesting to tell you!"

"What is it, Maud?"

"Our dog Towser has not been feeling very well. We did everything we could think of for him, but he got no better. At last we called in the doctor. When he came he looked Towser all over. The first question he asked was, 'What does Towser eat?' When we told him that the dog always got the scraps from the table, he wanted to know whether he got any uncooked food. We thought hard for a moment and then said, 'No.'

"'All Towser needs,' said the doctor, 'is more fresh meat. Every dog needs some uncooked food.'

"Then I thought of the broadcast at school, and I asked, 'Doesn't he need some vitamin C?'"

"The doctor looked surprised. 'Yes, Maud, you are right; but where did you hear about it?'"

"When I told him about our broadcasts on health at school, he looked pleased and said, 'Well, there is a school that is alive.'"



Good morning. This is the time for our regular broadcast on health from Station HHS. I am pleased to introduce to you Philip Howe, who is going to tell you other interesting things he has found out about vitamins. Boys and girls of the Work Together Room, Philip Howe.

[*Philip began:*] In the last broadcast Bob told you about a strange disease called scurvy and the way it could be cured and prevented by eating fresh raw fruit and vegetables, which contain vitamin C. Today I want to tell you something just as interesting about a disease called rickets. Rickets may be cured and prevented by vitamin D.

All of you have probably seen children who have rickets. Children with this disease have soft bones; they are often bow-legged; sometimes their knees bend in so as to touch each other in walking. Often their chests are not well formed. Their jaws are undersized, and their teeth are crooked. What affects the bones also affects the teeth, since bones and teeth are



*Sun-worshippers*

Many of the Indians worshiped the sun. Even these savage peoples knew how important the sun is as the source of life. Does sunshine have anything to do with our health? Is there anything that will take the place of sunshine? (From a painting by David C. Lithgow)

made of the same material. There are two substances which the body needs particularly in making bone and teeth. They have rather hard names, but you have heard them before. One is calcium and the other is phosphorus; but even when the child's body is supplied with these minerals, the child will have rickets unless its body is able to get vitamin D. The body is like a building. Foods are like the materials used to build with. They must be put in place and firmly fixed, each piece where it belongs. In the body, vitamin D acts to unite the calcium and phosphorus that we get in our foods, to form the bones and the teeth.

In our previous broadcasts we learned about the foods which supply vitamins A, B, and C. One of the

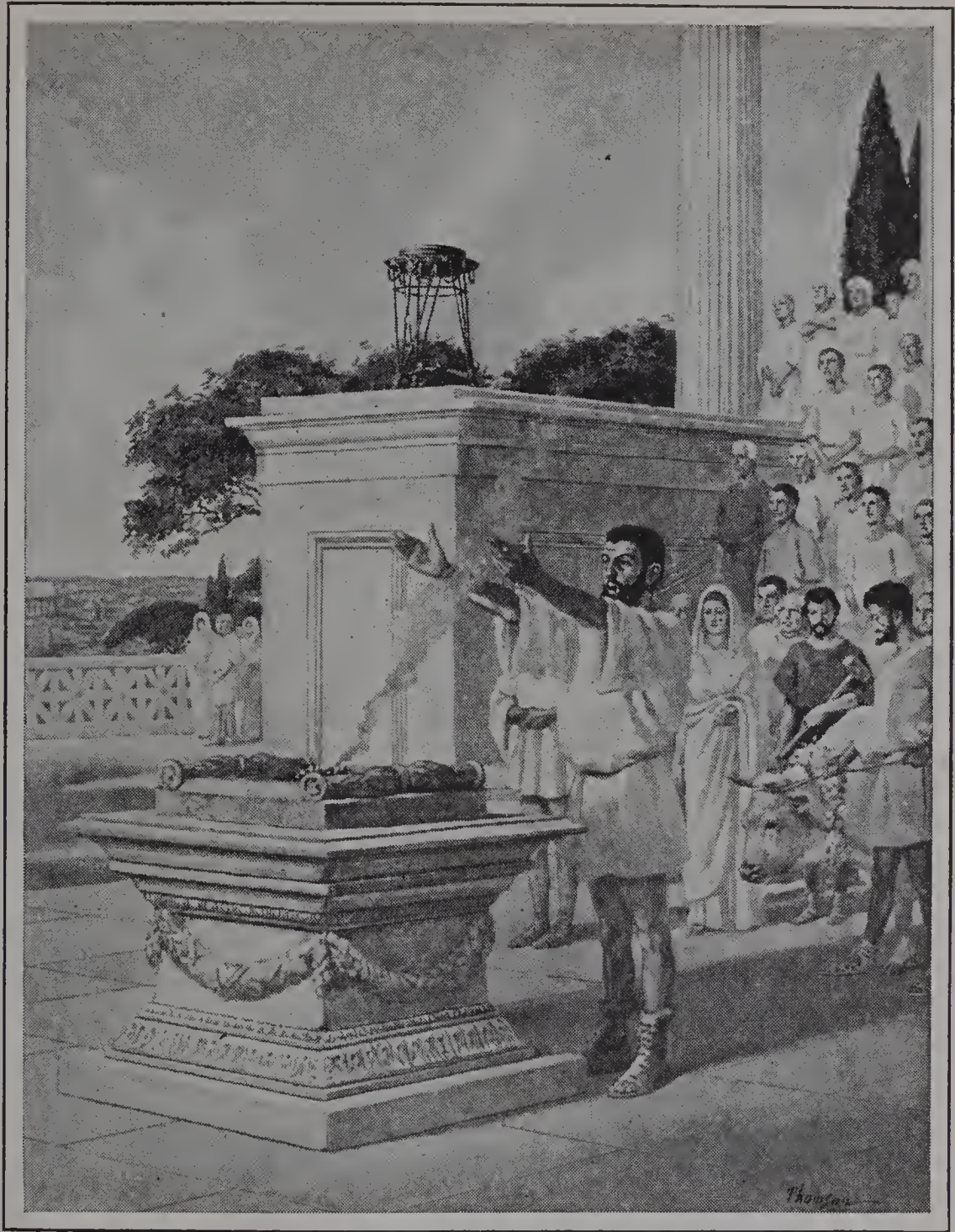




most interesting discoveries about rickets is the value of cod-liver oil as a cure for it. Cod-liver oil and egg yolk are the only natural foods rich in vitamin D. We should get our daily supply of vitamin D from some other source than food. Scientists found that the skin, when exposed to the sunlight, manufactures its own vitamin D and so is a powerful aid in curing rickets. This explains why rickets is not found in our Southern states or in the tropics. Scientists have also found that they could put vitamin D into certain foods by passing them under artificial sunlight.

Probably you know that some of the Indians in South America and certain tribes in Asia and Africa have worshiped the sun. That is not strange when you stop to think about the importance of the sun to health and well-being. The sun means life. Without the sun all life on the earth would disappear. The miracle of the seasons is due to the sun. As you probably know from your study of geography, when our winter comes the northern half of the earth is turned away from the sun, so that fewer rays reach our half of the earth. The farther north we go the less sunlight we find, and finally in the extreme north there is the long night when darkness reigns. As winter comes on in our temperate regions, the natural world changes. Plants and flowers die. Snow and ice cover the land. Many of the birds that cannot stand the cold go south, where it is warm.


What a change takes place with the return of the sun! The ice and snow disappear. The birds return



*The Romans celebrate the return of the sun*

December twenty-first is the shortest day in the year. From that time on the sun shines a little longer each day. The Romans had a great festival about this time to welcome the return of the sun. Do you think this was a good reason for joy? Why?

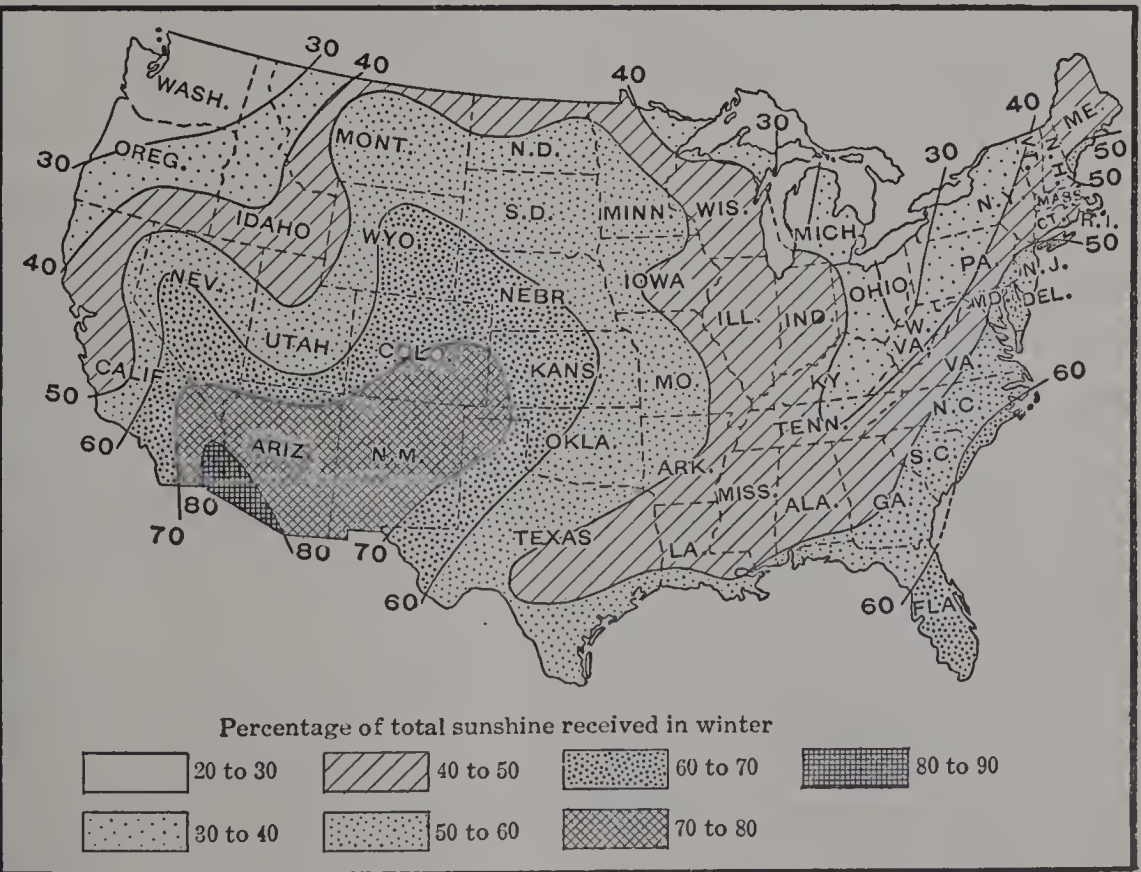
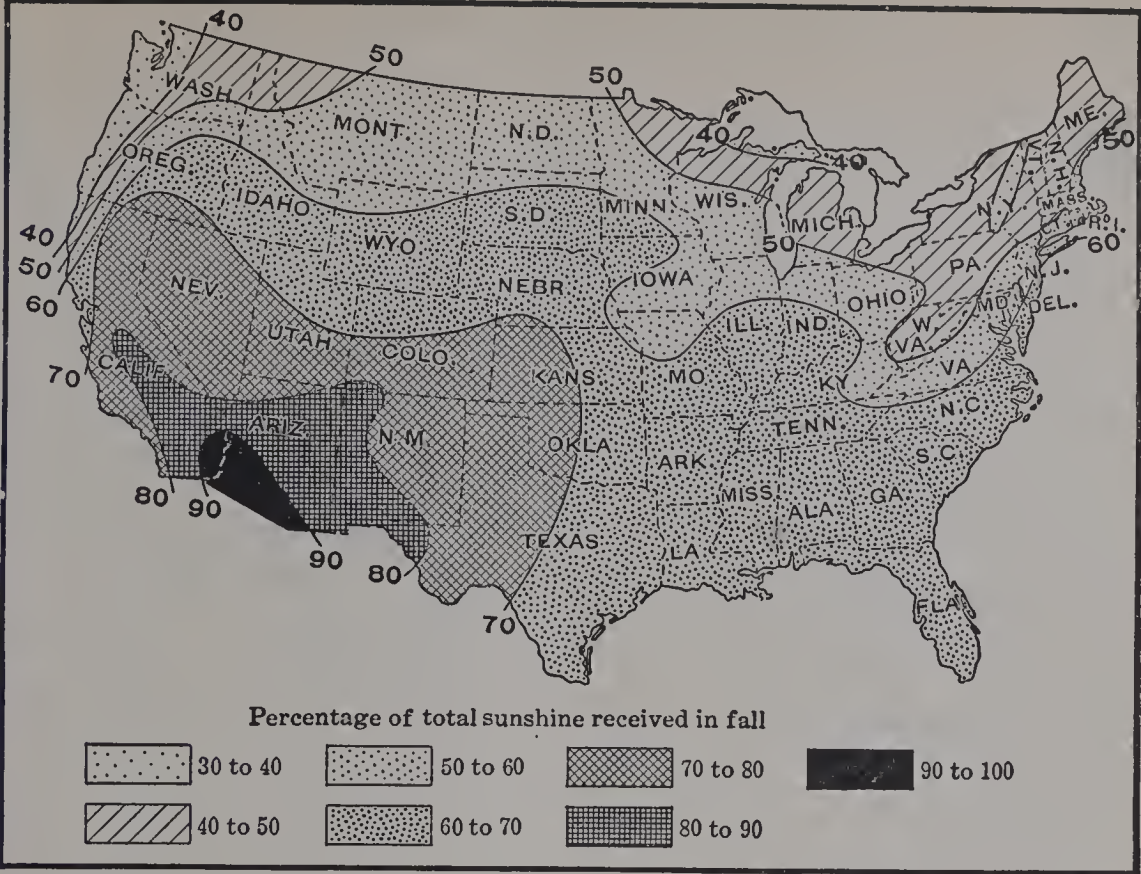


 and build their nests. The leaves and flowers burst forth. Butterflies, bees, and insects awake. Up in the arctic region, since the northern half of the earth is now turned toward the sun, there is a long, long day. The sun does not set for six months. In the northern part of Norway and Sweden the sun shines continually for this length of time. This far-northern country is sometimes called the Land of the Midnight Sun. Many of you may be surprised to know that during this period of sunshine very beautiful flowers and delicious berries grow there rapidly.


So you do not wonder that there have been people who have worshiped the sun as the Giver of Life. The Romans, in the time when they were pagans, set aside a special day for feasting and celebration in honor of the sun. On December 21 the sun reaches the farthest point south and then starts on its silent march to the north. That is the shortest day of the year in hours of sunlight. This return of the Great King, the Sun, that brought life and plenty to the Roman empire, was celebrated by a magnificent festival, or time of feasting and joy.

Everybody knows that when a plant is in a dark room it tends to grow pale and unhealthy. But how it struggles for the light! It bends and stretches as hard as it can to get into the sun. Most plants will finally die if they cannot get to the sunlight. The same thing is true of animals. If two chickens are fed plenty of good food and water, and one is kept in the darkness and the other has sunlight, the one kept in the darkness





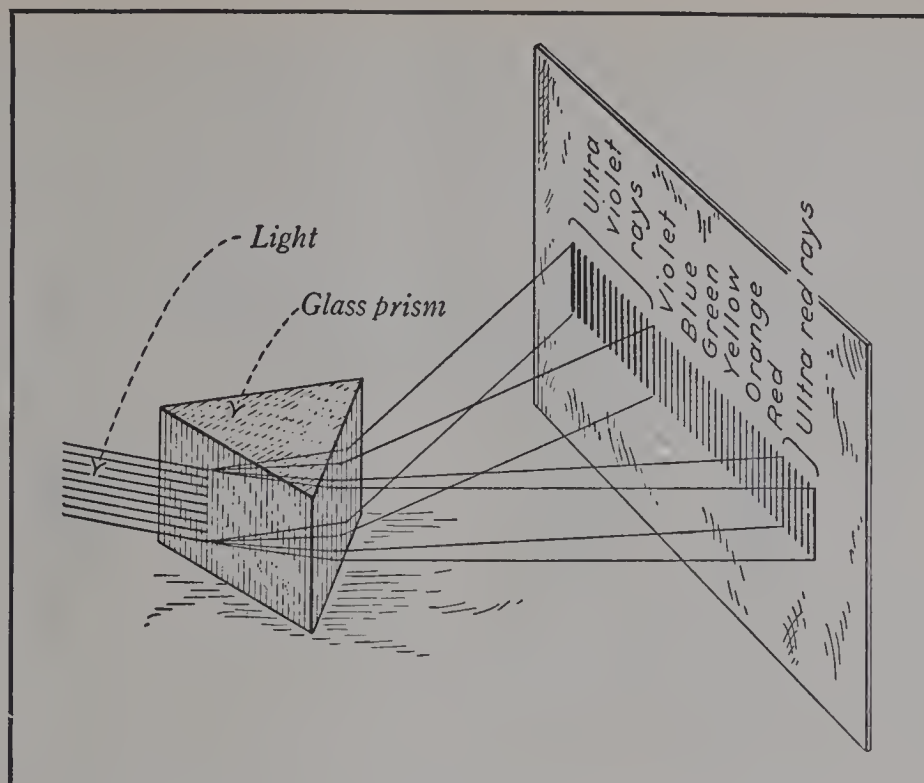
Maps showing amount of sunshine in different states

 will be stunted in growth, its bones will not grow, and it will very early show signs of old age. Finally, if kept away from sunshine too long, it will die.

School children like ourselves are indoors a large part of the day, the only hours when the sunshine is strong. In most parts of the country winter sunshine is only one eighth as strong as summer sunshine, and the city sunshine is but half as strong as country sunshine. Bundled up as we are, we get hardly any of some of the important rays of the sunshine all winter. Knowing these facts, scientists wondered why the Eskimo, who gets no sunshine at all for months, has the finest of teeth and bones. They found the answer in his diet. He lives on fat fish, fish livers, and eggs of fish-eating birds. These foods, like cod-liver oil, are rich in vitamin D.

Babies born in the early winter are more likely to have rickets than those born in the late winter. Probably you know why. The baby born in the spring gets more sunshine. Nowadays most doctors, in order to make sure that children get enough vitamin D, ask mothers to give them cod-liver oil, halibut-liver oil, or a vitamin-D medicine, called viosterol, every day. Vitamin-D foods, such as specially prepared vitamin-D bread and milk, are also recommended. They are good for grown-ups also.

I was surprised to find out that it is only a certain part of the sunlight which has this health-giving quality. Have you ever held in the sunlight a solid piece of glass called a prism? If you have, you have noticed that it broke into beautiful colors of the rainbow. You



*A prism breaks up the rays of the sun*

How many different kinds of rays are there? What are their names?  
Which is the most important?

could see red, orange, yellow, green, blue, indigo, and violet rays. These are the visible rays of the sun. There is another kind of ray next to the violet, called the ultra-violet (*ultra* meaning beyond), which cannot be seen by the human eye. We know that ultra-violet rays exist, because photographs can be taken with them. These ultra-violet rays are the part of the sunshine that enables the body to make its own vitamin D. As you have learned, we need to be out of doors in the summer sunshine to make use of ultra-violet rays. Ordinary window glass strains them out of the sunshine. Special window glass has been made which will allow the ultra-violet rays to pass through.







*Down at the beach*

Bathing in the salt water is refreshing. These children are having a chance also to enjoy the sunshine. It is a good plan to get used to the strong sunlight gradually. How may they do this?

Since this kind of glass is not in common use, and also since there is so little of the ultra-violet ray in winter sunshine, I think we all need to depend for vitamin D on egg yolk, fish-liver oil, and specially prepared vitamin-D foods such as bread and milk. It is a good plan for children to be so dressed in the summer that the sun may get to their bodies.

Although sunshine is valuable for health, we may get too much. Sunburn is painful and may be dangerous. Our own bodies protect us against taking in too much ultra-violet ray, which gives us sunburn. In

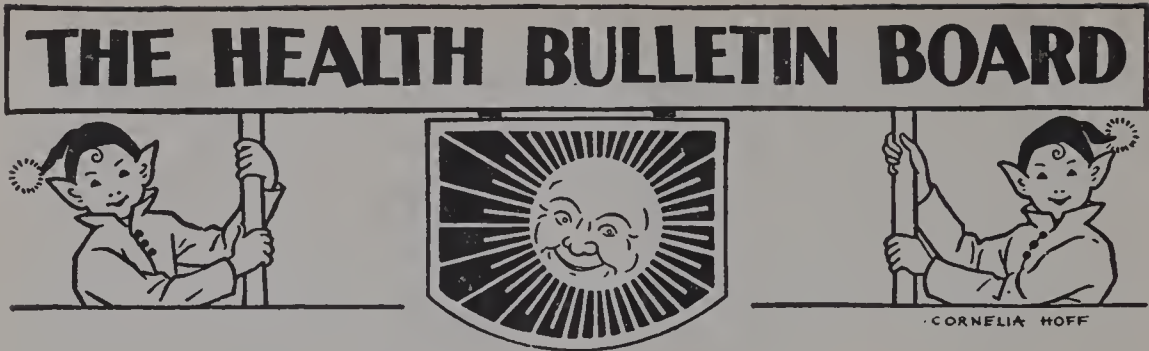
the lower layer of the skin there are some cells that manufacture a kind of dye which makes the skin look dark, or, as we say, tanned. After we have become tanned gradually, we are not likely to be uncomfortable. The natives of hot countries such as central Africa are dark. The Negro's black skin protects him from the direct rays of the sun. For this reason he can stand the sun better than the white man, who is not so well protected and thus finds it hard to live in such countries. But the Negro in his turn is not so much at home in a cool country. In one large American city it was found that more Negro children had rickets than white children. Their skin made it difficult for the sunshine to have much effect.

Some doctors have ultra-violet lamps which they use on people who for any reason do not get enough sunlight or enough vitamin D in their diet. Such lamps are used particularly in the winter. You boys and girls do not need to worry about vitamin D if you play out of doors in the sunshine and take vitamin-D foods or cod-liver oil in the winter.

Maps may show the amount of sunshine in different places. Study such a map. Do you live in a part of the country that has plenty of sunshine?

This is the last broadcast on vitamins. If you have enjoyed hearing about vitamin D as much as I have enjoyed telling about it, you will remember it for a long time. Good-by.





Philip told us some interesting things about sunshine. In winter we do not get so much as in summer. In the city, too, where there is so much dust, the sun’s rays have difficulty in getting through. I wonder how much sunshine we really get. I think it would be a good plan to keep a record in our notebooks on a chart like this:

Day	S	M	T	W	T	F	S	Total for week
Number of hours of play in the sun . .								

 Sam

Let us form a Sunshine Club. Here are some points worth remembering. Maybe you can add a few more.

1. All energy comes from the sun.
2. Without the sun there would be no life on earth.
3. The sun is a magic worker.
4. The ultra-violet rays of the sun are the ones we need to have fall on the skin in order to have good health.
5. Vitamin D prevents rickets. It enables the body to make use of calcium and phosphorus in making bone and teeth. Vitamin D is the builder.
6. The sun causes the body to manufacture its vitamin D.
7. Cod-liver oil contains vitamin D.



8. Ordinary window glass screens out the sunshine's ultra-violet rays that the body needs to manufacture its vitamin D.

9. Babies and growing children who do not get sunlight need cod-liver oil and other fish-liver oils or vitamin-D bread.

10. The ultra-violet lamp has the same effect as the sun.

11. When placed in the sun, some foods, such as yeast, bread dough, vegetables, and milk gain vitamin D.

12. Egg yolks contain vitamin D.

13. To belong to the Sunshine Club, we ought to spend as much time as possible in the sunshine. How many minutes in the day would you suggest?

I am going to use Sam's chart. Are you?

*Nancy*



I have an idea for nature study for our class. Let us plant some bean seeds in two pots, and two onions in separate pots. If we put a pot of beans and a pot of onions into a closet, and the other two pots in the sun, we can discover what the sun does for plants.

*Mary*

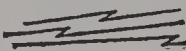


Tomorrow I will bring to class a glass prism which I have at home. What experiment can we perform?



*Jack*

*Mlaciuc* and *roushpophs* need *altur-tovile* rays before they can be used in the body. Help me straighten this out!



*Philip*

I added more words to my list today.

rickets

ultra-violet rays

*Eleanor*

### XIII

## *A Healthy Mouth*

GOOD morning, Marian. What is all this about?" It was Robert Lake, who had just come into the W. T. Room and found Marian trying to fasten a large white sheet of cloth on the wall behind Miss Leader's desk.

"Hello, Bob! We are going to have a little change from our regular health hour today. We're beginning a new subject. Tom found that Miss Leader had some interesting slides; so she has been invited to show us some pictures and tell us about them in the health hour."

"That will be fine," said Bob. "I know how to run the lantern. I'd like to help."

"Thanks. That's nice of you."

When the health hour came and Bob had the lantern ready, Marian, the class president, stepped to the front of the room before the white sheet and said:

"Boys and girls, we're going to have a specially nice health hour this morning. Miss Leader is going to tell us how important the care of the teeth is. Bob will throw the pictures on the screen with the lantern. May I present Miss Leader?"



I know you all want to see the pictures immediately, but I want to tell you something about our subject before we see the first picture.

In our broadcasts so far we have been talking about the different substances we must have in foods to make us healthy. Among those substances are such things as proteins, carbohydrates, fats, water, minerals, and vitamins. We are now ready to begin to answer a question which was asked early in the year: "How is our food — bread, meat, fruit, and vegetables — changed into flesh and bone?" This is one of the most wonderful things accomplished by the human body. Nobody knows the complete story of how it is brought about, but there are many things about it that we can understand.

Changing the food so that it can become a part of the body or be used by it is called digestion. All food must be ground, and dissolved into a liquid mass, so that it can soak through into the blood and so be used by the body.

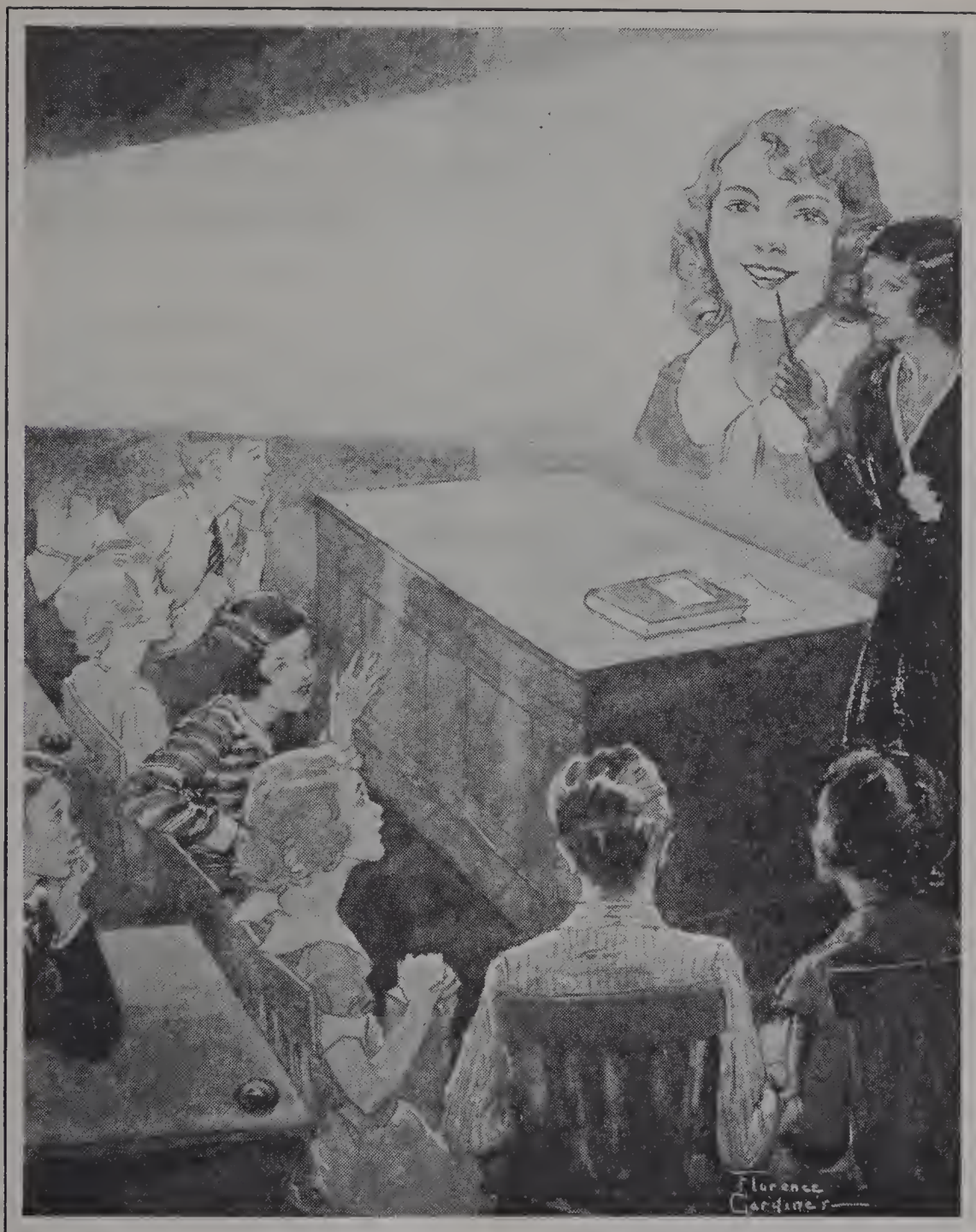
The preparation of food before it comes to the table helps digestion. Think of what happens to the hard kernels of wheat. After it leaves the farm, the wheat is carried to the mill, where it is ground into fine flour. Then it is baked into bread, cake, or muffins, and used in various ways in cooking. When it is cooked, it is softened so that the body can absorb it without too much trouble. Possibly you can think of other things



that we do to food to help the process of digestion before we take the food into our mouths.

Today we are going to think about the healthy mouth, because it is in the mouth that digestion begins. Now we are ready for the first picture, Bob. This is a picture of Alice Marie Thomas. She is about as old as you are, and she has an almost perfect set of teeth. How easily she can take care of her food at this first station on the digestive route! Her teeth are able to grind the hardest kind of food into a fine mass so that it may be swallowed. She has never had a toothache.

This is Thomas Wells. I can tell by the way you are exclaiming that you are sorry for him. As you see, most of his teeth are gone or are badly decayed. Those that are left are very irregular. He cannot chew his food well, and so the digestion of his food gets a poor start. Then, too, Tom finds it hard to be happy. Toothache is not pleasant; and when he can't find any place in his mouth where his irregular teeth come together enough for him to chew his food, he is very uncomfortable. Besides, when teeth decay, there is a poison which is turned into the blood and carried to all parts of the body. The poison in his body does not make Thomas feel good-natured or much like doing his school work. No wonder he is below the average of his class. If you were being fed a bit of poison every day, you would not feel happy either. I am glad that there is nobody here in this room with teeth like these; but probably we could all do more than we do to keep our mouths in a healthy condition.



*What beautiful teeth!*

Alice has almost a perfect set of teeth. Does a healthy mouth help one to be healthy? What can we do to have a healthy mouth?

It is unfortunate, too, that Thomas's bad teeth spoil his looks. Tom would be a fine-looking boy if it were not for his teeth. If he does not improve the appearance of his mouth, he will find it hard to be successful in life. Not many people want to employ a person who has a mouth that looks like Thomas's.



*Glands that manufacture saliva*

*a*, sublingual; *b*, submaxillary; *c*, parotid. What is the work of the saliva?

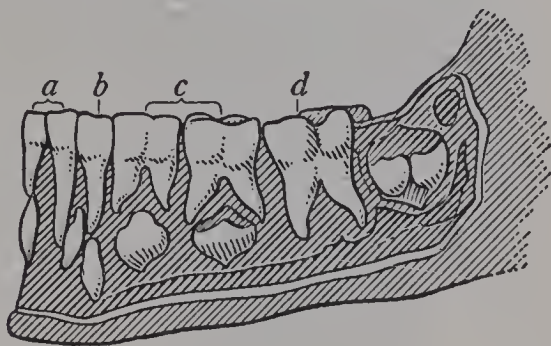
It is a common saying that looking at or smelling good food makes one's mouth "water." This is really true. Sometimes when you go home from school on a cold, snappy day, feeling very hungry, and open the kitchen door, you know at once that your mother is cooking something you are very fond of, and your mouth begins to collect water, or saliva. By the time you get your first mouthful of food you have plenty of saliva to moisten it so that you can chew and swallow it easily.

There are tiny tubes through which the saliva flows into the mouth. They start in little cups, or sacs, called salivary glands. There are three of these glands on each side of the face, or six in all. Look at the picture. This one under the tongue is called the sublingual (from the Latin *sub*, under, and *lingua*, tongue). The one just at the corner of the jawbone is called the submaxillary, which means "under the jaw." The third is called the parotid, which means "near the ear," and is



the gland that swells and gets sore when one has the mumps. These glands do important work.

Saliva not only moistens the food but also changes starch into sugar. One of the strange things about starch is that it will not soak through a skin or membrane. If the starch in bread were not changed into sugar, it could never be taken in through the lining, or membrane, of the intestines and thus be used by the body. As sugar it can readily be taken up and used. About one quart of saliva comes out of the glands, or is secreted, every day. Foods that contain vitamin A help these glands to work properly.

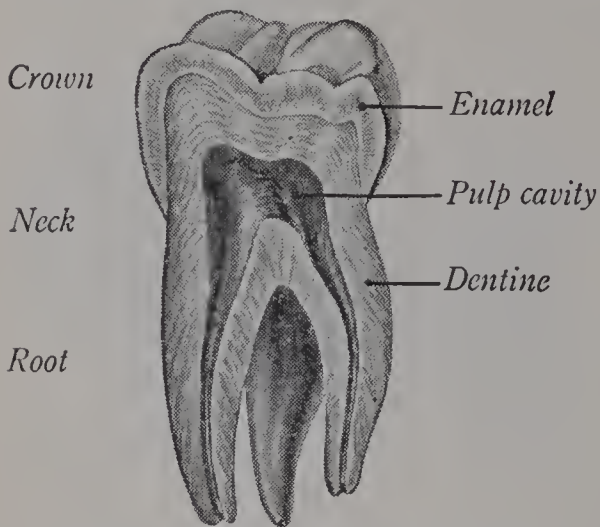


*Half of a child's jaw at the age of six years*

*a, incisors; b, canine; c, molars; d, six-year molar. The teeth below the gum are permanent teeth*

If you will look at a complete set of teeth, you will notice that, like good soldiers, each is fitted to do its particular kind of work. Look at these four chisel-like teeth directly in the front of the jaw. They are called the incisors, because they cut the food into bits. The tooth just beyond each of the incisors is called the canine, or holding, tooth. Sometimes it is called the dog tooth. *Canine* comes from *canis*, the Latin word meaning "dog." The teeth just beyond the canines at the back of each jaw are the molars, or grinders. When you eat green corn on the cob, you cut the kernels off with the incisors and grind them with the molars.

Children are not born with teeth, but by the age of two and a half years they have all their first set of twenty teeth. When they are six, the first tooth of the second set makes its appearance. Usually by the time one is eighteen the first set has been replaced by the new teeth of the second set, and in the mean-



*A molar tooth cut lengthwise*

Find the different parts of the tooth

time twelve more teeth have been added, making thirty-two in all. It is unfortunate that no tooth ever grows in the place of one of the second set that is lost. No false tooth is ever so good as a healthy tooth of one's own. When you know that a good set of teeth may bite

with a pressure of 200 pounds, you will realize that our teeth must be very strong.

Nature has tried her best to give us good teeth, as we shall see. This is the way a tooth looks. This sketch shows a molar tooth as it would look if it were cut lengthwise. The crown of the tooth is made of enamel, the hardest thing in the human body. The greater part of the tooth is made of dentine, a bone-like substance which is much softer than enamel and decays easily. The pulp cavity in the center has blood vessels and nerves that give the tooth food and life. The enamel and the dentine have no feel-



© Harris and Ewing

*The Lincoln Memorial*

This beautiful building is made of material which contains calcium.  
What do you know about calcium?

ing; but just about as soon as decay works its way into the pulp cavity, toothache begins.

We have learned a good deal about the teeth, but the most important thing for us to know is how to have and keep good, healthy teeth.

Look at this beautiful building. It is the Lincoln Memorial at Washington, a monument built to help us to remember Abraham Lincoln. When you visit our famous capital city, you will want to spend a long time going through this Memorial, looking at the remarkable statue of Lincoln, reading quotations from his great speeches, and thinking about his life. This strong, stout building is built of marble and limestone, rocks which are largely calcium.



Likewise it is the calcium and phosphorus substances, or material, in our bones that help to make them strong and hard and straight. The boy with bow-legs did not have enough calcium and phosphorus in his food; or, if he did, there was a lack of vitamin D. It's also the calcium and phosphorus substances in our teeth that make them sound and hard. One reason why teeth decay is a lack of minerals and vitamins.

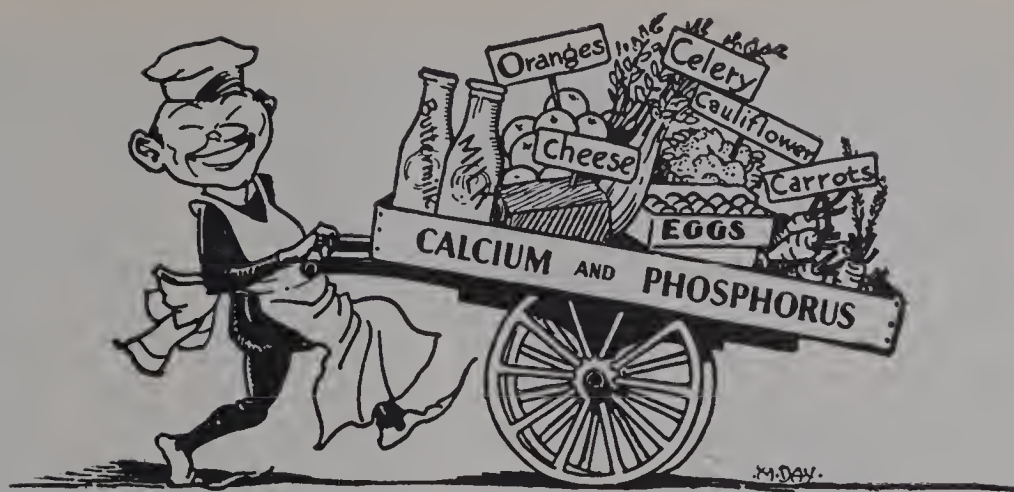
Where does the calcium and phosphorus come from that we use in our body to make strong bones and sound teeth, James?

"It comes from our food, Miss Leader."

Quite right, James. Before our second teeth appear, they are growing unseen down in the jaw. If we do not eat enough food rich in calcium and phosphorus, and get vitamin D in some form during that time, our teeth are likely to be soft and to decay easily. Look at this chart. Here are the foods that are richest in calcium and phosphorus. What comes first? It is milk. Each of you ought to drink four glasses of milk a day, or have that amount in your food.

The right kind of food is necessary not only to help the teeth grow but also to prevent them from decaying. In a hospital in the state of Iowa a group of children with decayed teeth were fed food that contained not only calcium and phosphorus but all other things that make a good diet. In the case of every child the decay was stopped. It was seen that the dentine in their teeth changed from a soft condition to stony hardness.

Parents of five children with decayed teeth were



*What calcium and phosphorus foods did you have in your diet today?*

asked to help in an experiment for the purpose of finding out whether a proper diet had anything to do with sound teeth. Over a certain period of time each child was given a quart of milk every day, an egg, a teaspoonful of cod-liver oil, one ounce of butter, one orange, and two servings of fruits and vegetables, besides whatever other food he might eat. These foods contained all the vitamins and many minerals, especially calcium and phosphorus. Candy was permitted, but only after meals. At the end of ten weeks the decay had stopped.

This is a picture of one of the Eskimos that Dr. Adelbert Fernald of the Harvard Dental School met while on his trip to the Far North with Commander MacMillan. This Eskimo knows nothing about the white man's food, yet he has a perfect set of teeth. Listen to what Dr. Fernald says about these interesting people in this far-away land. "In Baffin Land," says Dr. Fernald, "where the natives eat practically nothing but meat and fish, more or less raw or uncooked, I

found absolutely nothing to do for them. They had no cavities, and full sets of normal, healthy teeth, nearly 100 per cent perfect."

Probably you wouldn't like the Eskimos' food even if it does make for good teeth, and you may wonder why



*An Eskimo with almost a perfect set of teeth*

Why did the Eskimos have no word in their language for toothache? Where do the Eskimos with the best teeth live? Why is it that many of these people have such good teeth and yet use no toothbrush? What lessons may the Eskimos teach us about the teeth? (From a photograph by Dr. Adelbert Fernald)

their teeth are full of cavities, and many of them are in such a condition that they cannot masticate their food properly." It was here that Dr. Fernald spent much of his time filling teeth, telling the natives the right kind of foods to eat, and showing them how to use a toothbrush. Dr. Fernald's story is much like that of others who know the Eskimos. Stefansson, a

this food helps them to have such good teeth. You learned the reason why in our last broadcast. We do not need to have the diet of the Eskimos, but we do need to know how to choose our food wisely.

How different were the teeth of those Eskimos who lived farther south and had learned to eat the white man's food! Dr. Fernald says: "At the Moravian Mission, where Eskimos eat the white man's diet,





*Chinese children learning how to brush their teeth*

Do you know how to brush yours? What does the teacher have in her hand? What is she saying?

famous arctic explorer, says that the Eskimos had no word in their language for toothache until they began to eat the white man's diet. It is only when they try to live on the white man's diet that their teeth become as much decayed as the white man's.

If you have a good map of Scotland, you may find off the northwest coast of the mainland the island of Lewis-with-Harris. At one time the inhabitants of this island had wonderful teeth. That was before ships came there with "civilized foods," such as white flour and sugar. Painfully the islanders discovered that these ships were really bringing them cargoes of toothaches. The new



*Brush from the gum line toward the biting surface of the teeth*



*Brush the upper teeth down, starting from the gum line*

diet lacked something that was needed for teeth and bones. That something was vitamin C, which we have heard about in one of our broadcasts.

We know that a total lack of vitamin C causes scurvy. Scientists now believe that too little vitamin C in our modern diet causes a milder form of the disease, which is responsible in part for decay in teeth and for gum troubles. We need to feed our teeth. They are alive.

Probably if we all ate the right kind of food, there would be no need of toothbrushes. We may come to that in time ; but just now it seems desirable for everybody to learn how to clean his teeth properly.

I hope you all know the kind of toothbrush to buy. It should be small, so that you can easily brush every tooth. To do its work a brush needs to be stiff. It is





*Brush the lower teeth up  
from the gum line*



*Brush from the gum line up-  
ward to the biting surface*

a good plan to have two brushes, one for morning and one for evening use. A brush should always be rinsed well after it has been used. I would not put my brush under the warm-water faucet. Warm water softens the bristles, so that they often get loose and injure the gums, and gets the handle out of shape. Perhaps you can tell me about other things that we need to do to take care of our brushes.

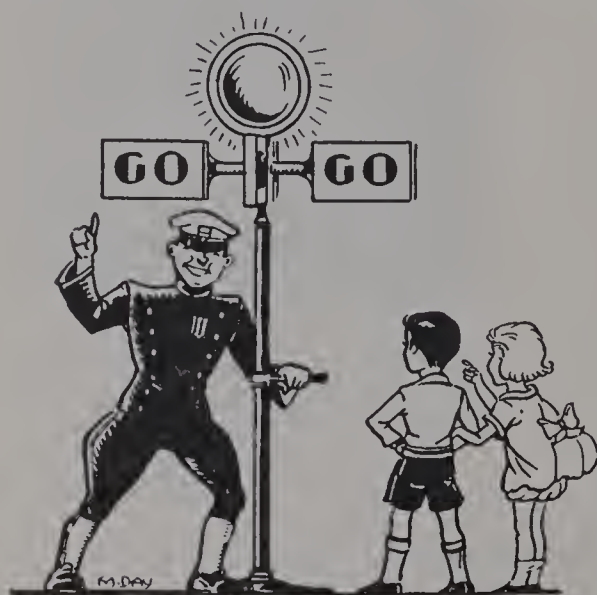
Not everybody knows how to brush the teeth. It is foolish to draw a toothbrush across the surface of the teeth and then expect to have them clean. The food particles are usually held in between



*Brush the chewing surfaces*



the teeth. The brush must be used in such a way that the bristles will be forced in between the teeth. Brush the teeth of each jaw separately. Begin at the back of the mouth. Put your brush firmly on the gum at the back of the mouth [*as shown on page 138*].



*Where will you go?*

This kind officer is telling these children that it is safe to go down the street. If it were your teacher, she might also say, "Go to the dentist every six months." Why is this good advice? How often do you go?

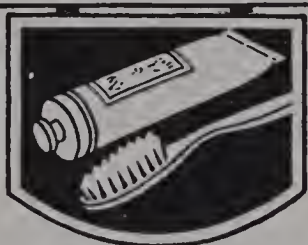
If you begin on the upper jaw, brush down over the teeth toward the biting edge. When you get to the lower teeth, brush them up. The inner surface should be brushed. The chewing surface also should be brushed. Take about three minutes to brush your teeth. Use paste or powder that is not too gritty, or sandy. Ask your dentist about the kind of toothbrush that you use.

No matter how careful you are, you cannot keep your teeth entirely clean with a toothbrush. That hard material called tartar will stick to the teeth, especially if the enamel is soft or uneven, and you need a dentist or his helper, the oral hygienist, to remove it. If the dentist sees you every six months, he will notice the beginning of decay and, by prompt filling, save you pain and expense.



Just then the school bell sounded; it was exactly twelve o'clock. Time for lunch in the Chew-Chew Inn.

## THE HEALTH BULLETIN BOARD



CORNELIA HOFF.

I have just been to see my dentist. We had quite a talk about the way to have good teeth. He gave me this information which you may like to have:

1. Good teeth are necessary for our health. A hen has a special organ called the gizzard to grind her food. That is the reason she can swallow her food whole. Since we have no gizzard, we need to chew our food well.

2. Good teeth are necessary for success in living. Do you think a teacher or a clerk can get a good position if either has decayed or dirty teeth?

3. Use a small brush. With it you can brush every tooth easily.

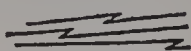
4. It's a good plan to have two brushes, so that one will always be dry and stiff enough to give the teeth a good cleaning and the gums a brisk massage.

5. Don't believe everything that advertisements tell you about the value of toothpastes. The thing of most value is not the paste, but the general care you take of your teeth by eating the right kind of food, by brushing the teeth, and by visiting a dentist regularly.

6. Brush your teeth upon arising in the morning and before going to bed at night. Can you give some more advice?

*Polly*

Will somebody make out a list of questions on my illustrated talk?



*Judith Leader*

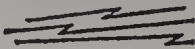
Look into a mirror and inspect your teeth. What "signal" do you get from that inspection?

*Harry*



I read of an interesting experiment we might try. Take a sausage skin, fill it with strong solution of sugar, and suspend it in a glass of water. After a half-hour taste the water in the glass. It is sweet. This is the way food passes from the intestines into the body.

*Albert*



My new-word list is growing. I added several new ones today.

digestion

saliva

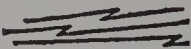
canine

sublingual

submaxillary

parotid

*Charles*



Which is better : to feed our teeth or to fill them? Who can explain?

*Harold*



## XIV

### *How Food is Changed into Ourselves*

I NEVER knew before that the teeth were so important for health, Miss Leader," said Tom. "My father says that sometimes decayed teeth cause pains in the muscles and joints. He was beginning to have such pains in his arms that the doctor asked him to go to his dentist to have his teeth thoroughly looked over. He had several of his teeth pulled, and the pains left."

"It's always safer to have teeth taken out if they are badly decayed and cannot be filled."

"I went to our dentist yesterday and had my teeth cleaned and two of them filled," said Tom, and he smiled to show his white teeth.

"That's fine," said Miss Leader. "I am going to put your name down on this chart." She held up a Roll of Honor. Across the top was printed, "I Have Just Been to the Dentist." Underneath the heading she wrote the name Tom Jones.

"There," she said. "Miss Wise will be in next week, and I hope that by that time we shall have a longer list. How many of you will see the dentist this coming week?"

"I will, Miss Leader," said Allen.

"This morning mother asked me to go," said Mary.

"Good! That gives us a fine start. Oh, here are Marian and Dr. Amster!"

"Boys and girls," said Marian, as she led Dr. Amster to Miss Leader's desk, "I have a treat for you. We are not going to have a broadcast today, but Dr. Amster is going to tell us more about the story of digestion, which Miss Leader began the last time. You all know our good friend, Dr. Amster. He does not need to be introduced. Dr. Amster."



Good morning, boys and girls. Last week Miss Leader spoke to you about the process of digestion that takes place in the mouth, and told you how necessary it is for you to keep your teeth in good condition. Today I am to go on with the story.

Let us suppose that you are eating a buttered ham sandwich. The sandwich is ground into fine particles by the teeth and moistened with the saliva. The saliva starts to turn the starch into sugar. Next, this soupy, ground-up mass is forced by the tongue to the back of the mouth. As you know, there are two tubes in the neck. One is the air tube, or trachea, leading to the lungs; the other is the food tube, or esophagus, leading to the stomach. There is a little lid called the epiglottis over the trachea. As the food is forced into the back of the mouth, this little lid shuts down and the food slips, as it should, over the air tube

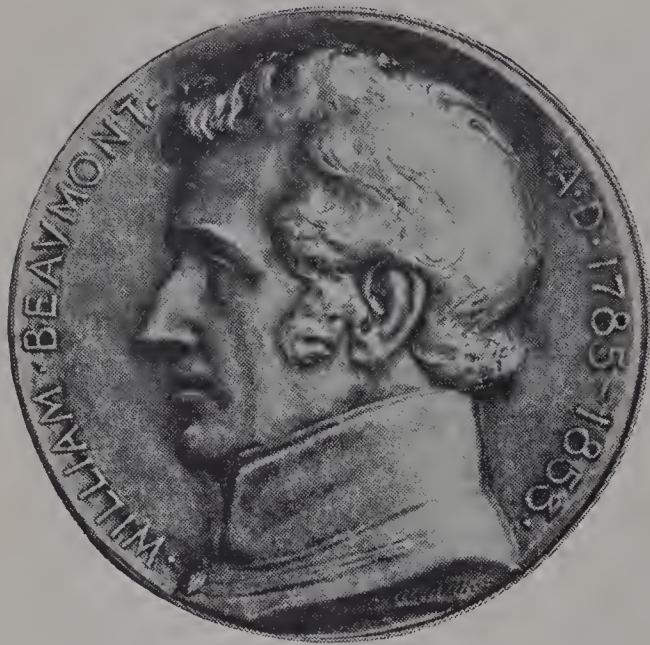
and down into the esophagus. The food now passes along the esophagus to the stomach, a kind of bag which holds about three pints. You have perhaps noticed that when you laugh and swallow at the same time, your food may go down into the air passage and choke you.

Before talking to you about the stomach itself, I want to tell you an interesting story about the way we found out how it works. Today, of course, we can see by means of X rays how the stomach works. But in olden times little was known about it, and people had all sorts of ideas about what happened to the food in the stomach. It was just about a century ago that an accident happened in the Northwest which led to our learning more about the stomach than we had ever known before. A half-breed Indian named Alexis St. Martin, was accidentally shot at a trading station near Mackinac. The explosion tore away the flesh covering a part of the stomach and shaved off a bit of the layer of the wall of the stomach. A young American doctor by the name of William Beaumont was called upon to treat him. The Indian was not expected to live, but he did, although the wound remained open in such a way that the skin could be pushed back to expose the thin covering of the stomach. Through this thin covering Dr. Beaumont found that he could look directly into the stomach.

Dr. Beaumont tried all sort of experiments on St. Martin. For instance, he watched the digestion of a piece of meat. Dr. Beaumont found that within



two hours the meat was gone. During this time he noticed that juice was secreted from the walls of the stomach. By means of a tube Dr. Beaumont was able to get some of this juice, which we now call the gastric juice. He examined it carefully. He found that when



*Dr. William Beaumont*

He learned a great deal about digestion through the study of Alexis St. Martin, who was known as the man with a window in his stomach. Just what did Dr. Beaumont learn? (Courtesy of *Hygeia*)

this gastric juice was put into a bottle with some food, it would digest the food in the same way as it did in the stomach, only more slowly. He also watched the movements of the walls of the stomach.

One of the things that made this study hard was the habit that St. Martin had of forgetting all his promises. He led Dr. Beaumont a merry chase among the trading posts of the

Northwest, but the physician pursued him from place to place to carry on his study of digestion and make his notes. In spite of these difficulties Dr. Beaumont made discoveries that were worth while and changed the ideas of people about digestion in the stomach. We now know that proteins are dissolved in the stomach. There is very little action on the fats. In the case of a sandwich the only part changed is the white connecting tissue, or

material, that holds the threadlike fibers of lean meat together. When this tissue is dissolved, the lean meat breaks into small pieces.

Did you ever stop to think about what makes us feel hungry? The studies of several scientists have shown that when the stomach is empty, there are movements of the stomach walls. It is these movements which cause us to feel hungry. This helps us to understand why we get hungry more quickly after we eat vegetables than after we eat meat, because meats stay for a time in the stomach, while vegetables pass on more rapidly, leaving the stomach empty.

There is a ring of muscle called the pylorus at the lower end of the stomach. It is a kind of gatekeeper. The pylorus allows food that has been properly digested to go on into the small, or upper, intestine for further digestion.

The small intestine is a tube about twenty feet long. Three sets of glands pour their juices into the small intestine. The intestinal juice is manufactured by the glands in the inner lining of the intestine. Bile comes from the liver and acts especially on fats. The pancreatic juice is made by an organ called the pancreas. All kinds of foods — starches, sugars, fats, and proteins — are dissolved by the action of these three juices. The ham sandwich at this point is reduced to a soupy mass.

It is in the small intestine that the food which can be used by the body is absorbed. We may say that it soaks through the inner surface of the inner lining. Finally, it gets into the blood, where it may

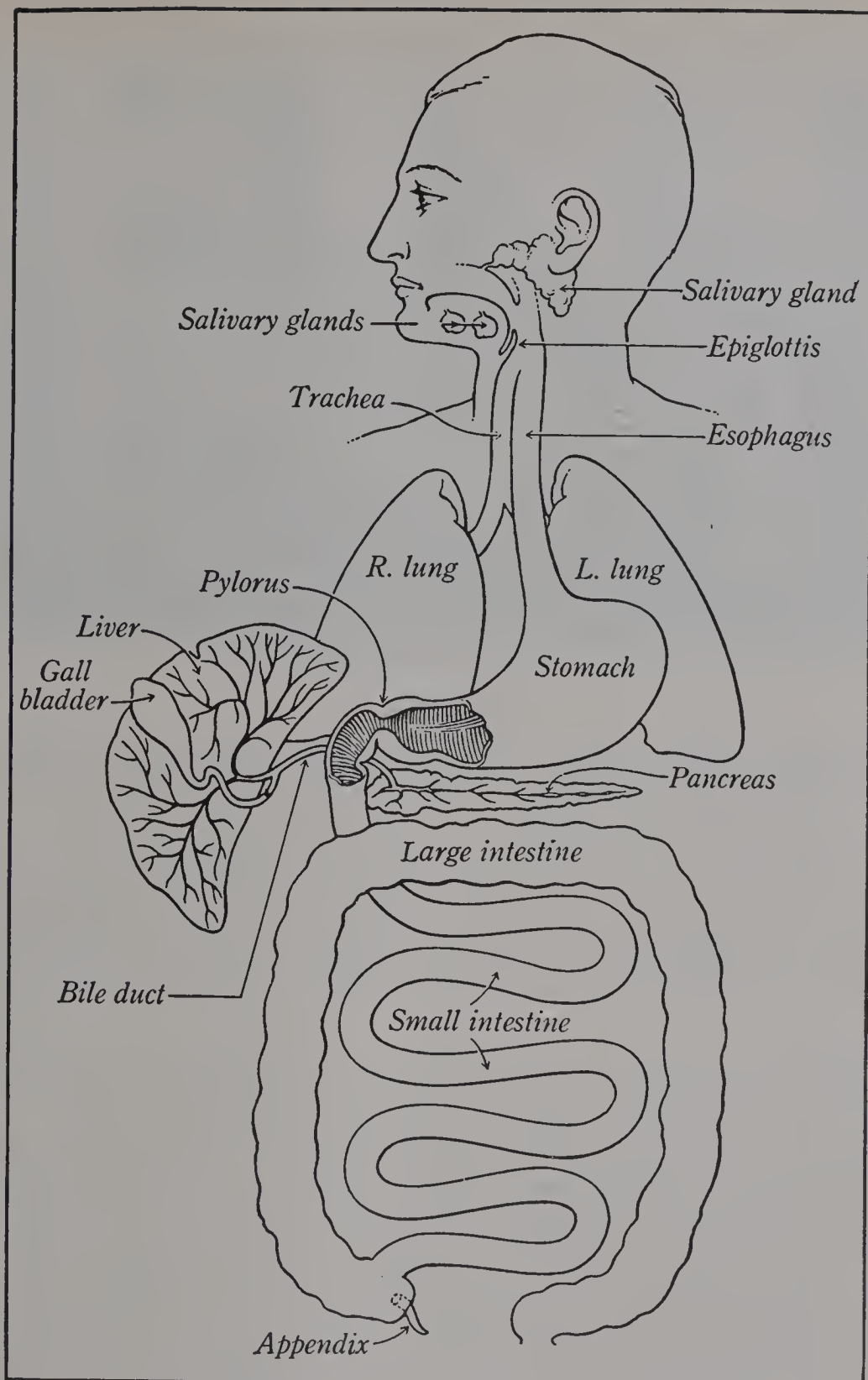
be used as energy, stored away for future use in the form of fat, or used for growth and repair.

The part of the food that is not digested goes on into the large, or lower, intestine, where it remains until thrown off by the body. This throwing off should be done daily if one wishes to be healthy. If waste material is allowed to remain in the large intestine too long, its poison may be absorbed by the body. One should visit the toilet every day at the same time.

The stomach does its work best when the mind is at ease and the body rested. Children often rush to the table when they are heated and excited with play. They may not seem to have any bad results at the time, but they will be pretty sure to suffer for this harmful habit when they grow older. It is far better to give the body time to rest and become cool and the nerves a chance to become quiet before eating; the food will not only taste better but will also digest better.

Meals should always be eaten at regular hours. Much harm is often done to one's health by the habit of eating irregularly and between meals. The stomach needs rest as well as the other parts of the body. If it is made to work all the time to take care of extra food, it will soon become worn out and refuse to work at all. A large part of the ills of the body comes from the abuse or overworking of the stomach. There ought to be from four to five hours between meals, and meals should be served at the same hours each day. Plenty of time should always be taken for eating, for there are





*Diagram of the digestive system, which Dr. Amster used in his talk*

Study this with care as you read what Dr. Amster said



*A happy hour*

Mealtime should be one of the happiest times of the day. Why?  
What are you doing at your home to make it happy?

few habits worse for our health than the habit of swallowing our food in haste. The few minutes gained by hurrying in this way are sure to be dearly paid for by and by.

When food is taken into the stomach, the blood rushes toward the stomach and raises its heat. This is because a certain amount of heat is needed to digest food properly. On this account we ought to keep quiet for a while after eating, for lively exercise always causes a rush of blood to the surface of the body; and as this draws the blood away from the stomach, the stomach does not have heat enough for digestion. It is not necessary to remain perfectly still, for quiet exercise, which does not heat the blood, will harm no one; but

games that require running or leaping, such as skipping rope, should not be played for at least an hour after eating. Brain work, too, causes the blood to rush toward the head, and children therefore should not study immediately after a hearty meal.

There are many other things that could be told about digestion. One of the principal bits of advice that I have to give you is this: Try to be cheerful. Cheerfulness helps digestion. Make mealtime the happiest time of the day. Good-by and good luck!



"Thank you, Dr. Amster," said Marian. "I am sure everybody in the W. T. Room liked your talk. Wouldn't it be a good idea to tell stories sometimes at the table? The other day I read that a famous theater manager said that every laugh in a play is worth a thousand dollars. How much is a laugh at mealtime worth, Dr. Amster?"

"Well," replied Dr. Amster, "I really don't know, but I am certain that a sense of humor makes life worth living. If we could get a few hearty laughs every day, I am sure that we might add several years to our lives."

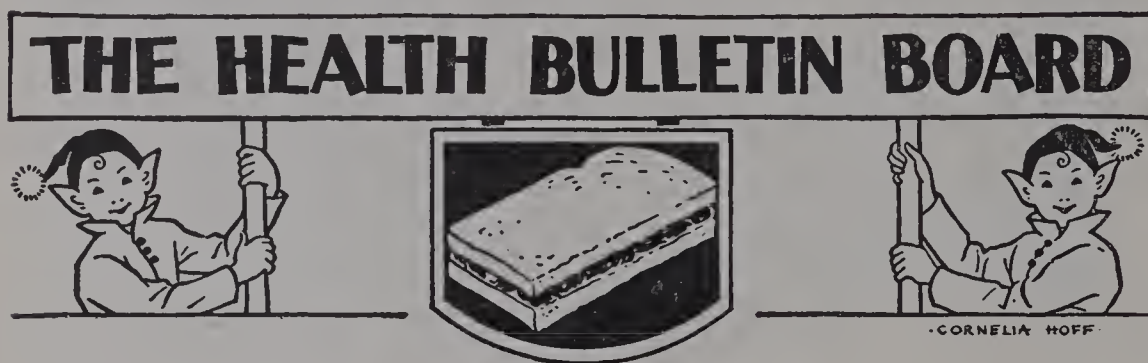
"There is a saying 'Laugh and grow fat,'" said Marian. "Is that true?"

"Yes, there is some truth in it," said Dr. Amster. "A pleasant state of mind helps digestion. That means that cheerfulness helps the body do its work better



and with less energy, and so the unused energy may be stored up in fat."

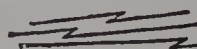
"Perhaps some of you will think of some stories to tell that will keep us in good spirits and in good health," said Marian. "Let's plan to tell them to one another when we eat our lunches at Chew-Chew Inn."



Since Dr. Amster's talk about the digestion of a sandwich, I have found this clipping for my notebook: "The fondness for the game of chess of the former Earl of Sandwich, an English noble of the eighteenth century, was responsible for the delicacy bearing his name. He would play for hours, ordering his servants to bring him sliced meat between layers of bread so that he might eat while playing. This food arrangement came to be known as the sandwich."

I like a lettuce and tomato sandwich with salad dressing. What is your favorite sandwich?

*James*



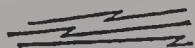
We have organized a "Fun Makers' Club" at our dinner table. Everybody who says something disagreeable has to pay a fine of two cents. I haven't had to pay a fine yet. Everybody at the table is expected to tell one interesting thing. We all look forward to dinner now.

*Betty*

## How Food is Changed into Ourselves 153

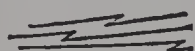
Let everybody try to make some review questions on Dr. Amster's talk or write some true-false statements or sentences with some missing words.

*Judith Leader*



I decided that the organs of digestion are like parts of a factory. The mouth is the receiving and chewing station. Who can go on with the comparison?

*Tom*



Three words were new to me in today's broadcast:

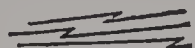
bile

pancreatic

pylorus

How many new words have you in your notebook? I am going to count mine soon.

*Lawrence*



Copy in your notebook, and see if you can put the right word in the right place:

rest

laughter

wash

roughage

happy

1. We should ----- our hands before eating.
2. Children should ----- before eating.
3. ----- helps digestion.
4. Foods containing ----- help to get rid of wastes.
5. Healthy children are ----- children.

*Polly*

## *The Story of Milk*

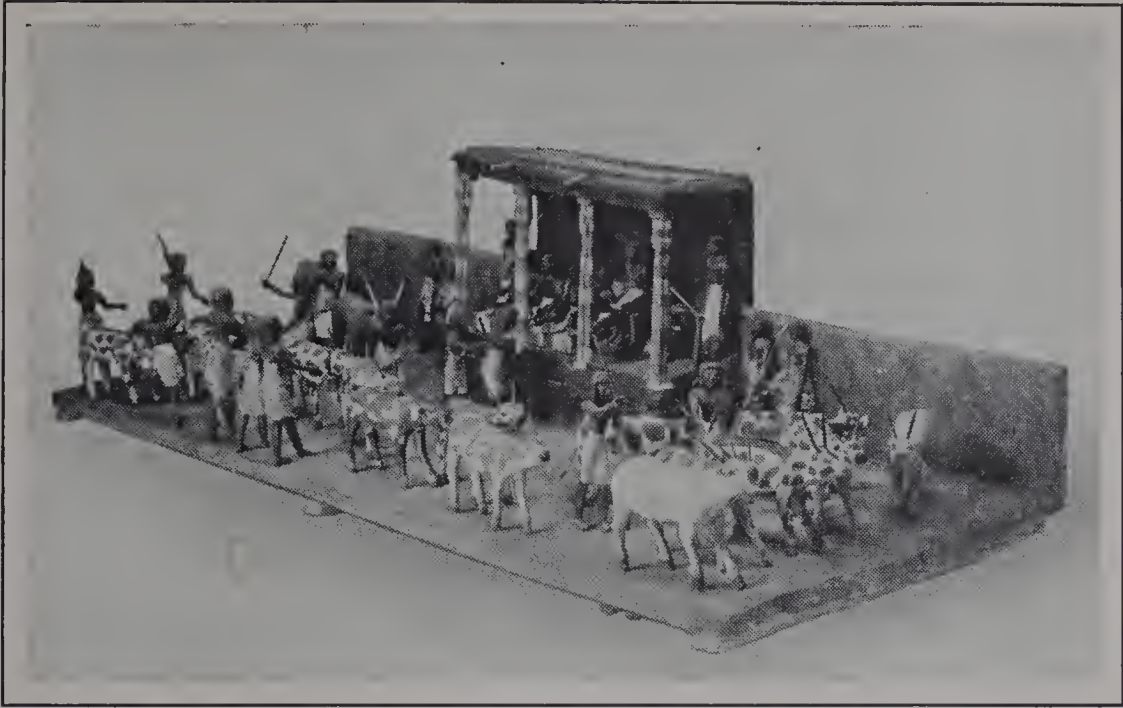
THE boys and girls of the W. T. Room were all waiting for the day's broadcast. It was easy to see what it was to be about, for the blackboard and the walls were covered with all sorts of interesting pictures about milk, butter, cheese, cows, goats, and camels.



This is Station HHS, with its regular health broadcast. Boys and girls, we are beginning today a series of stories on the different kinds of foods. Some of these stories will carry us back hundreds of years to the time when man was a savage. I wonder how many of you have ever stopped to think about the story that lies behind the glass of milk which you drink for luncheon every day. Today we are to hear some of this story as told by Richard Lewis.

[*Richard's voice was then heard:*] Boys and girls, it's great fun to explore. You all know how we like to read about such men as Admiral Peary and Commander MacMillan. For the last few weeks I have been exploring the story of milk.





*Egyptian models of cows*

They were taken from an ancient tomb. These models show that four thousand years ago the Egyptians had herds of cattle. Their cattle must have furnished much of the food of the Egyptians. (Courtesy of the Metropolitan Museum of Art)

'Way back at the dawn of history, before Rome and Athens were built, men were using milk for food. The cow in some countries was a sacred animal. The importance of the cow is shown by the place it has in our common speech and in our poetry. How natural it was for the ancient shepherds as they watched their flocks to look up and call that great track of light across the sky the "Milky Way"! That is its name even to-day. How natural it was for the ancient Hebrews in describing the Promised Land to speak of it not as a land rich in gold or jewels but rich in the best thing they could think of, "a land flowing with milk and honey"! Can you think of other examples?



At first cows were wild. Then man captured and tamed them. Nobody knows when man discovered that animals might yield milk for human use. However it was, the use of milk became general among ancient peoples.

The kind of animal that is used for milk differs in various parts of the world. The Laplander gets his supply from the reindeer; the Tatar, from mares; and the Arab of the desert, from camels. Many pastoral, or shepherd, peoples in cooler regions live largely on sheep's milk. In mountainous countries the goat is regarded as a precious yielder of milk, while in the swamps and jungles of the tropics the buffalo is herded for that purpose.

Switzerland, Germany, Austria, and Norway, as well as France, Italy, and Spain, use goat's milk by the millions of gallons. Often the goats are driven through the streets and milked right outside the houses where the milk is wanted. But it is not from goats, sheep, camels, or reindeer that most of the world's milk supply comes. It is from cows which are kept for this purpose all over the world. Such animals are known as dairy cows. Many are kept for making milk products, such as butter and cheese.

It seems probable that milk products, like butter, were discovered by accident. Perhaps a horseman galloping across an Asian plain one day, thousands of years ago, discovered butter. It may have happened like this. When he started, the horseman had with him a goatskin filled with milk. The journey was long





*Milking a goat in Switzerland*

Much of the wealth of Switzerland is in her large flocks of goats that supply an excellent quality of milk

and rough ; the day was rather hot. When he reached his destination and dismounted, and tried to satisfy hunger and thirst, he was bewildered to find something other than milk in his goatskin.

He tasted the yellow mass. Then he tasted it again, for it was good. Then he told the other herdsmen, who probably made fun of him ; but finally they tried it themselves and also found it good. Soon the tribe was making butter, hanging up the goatskins filled with sour milk and beating them with sticks or shaking them until the golden mass appeared. This is the way butter is made to this day in some parts of the world. Ever since that time, butter has been one of the most important foods of man, and he has built







different machines or devices for butter-making, the churn being the most common.

Butter was used as a food long, long ago. The records show that in East India butter was used at least as early as 2000 B.C. The Greeks had butter centuries before Christ, and it was popular in Roman times. Often it was used on the outside of the body to heal the wounds of both men and animals. Butter was also sometimes used on the face as a sort of cream, for it was believed to improve the complexion. In early Christian times and during the Middle Ages butter was regarded as a food for wealthy people. As time went on, people began to value their cows according to the amount of butter which they produced. In our great-grandmother's day the milkmaids used to have contests. The maid who drew the largest amount of milk from her cow received extra pay from the dairy farmer.

Cheese is a valuable food, rich in protein, fat, minerals, and vitamins. Cheese, like butter, probably was discovered by accident. Perhaps several thousand years ago another man started on a long journey, carrying milk in a bag made of a sheep's stomach. When he reached the end of his journey, he found that a miracle had taken place in the bag,— that there was a thick curd where milk had been. This was the first cheese. It was probably many years more before he discovered that there is something in a partly dried sheep's or calf's stomach that sours and thickens milk. That something is rennet. Cheese became so popular




*Shipping cheese*

Europe makes many varieties of delicious cheese. America imports some of this cheese. What can you say about the food value of cheese? Visit some of the stores in your town or city. Inquire about the number and kinds of cheese sold

as a food that herdsmen of Asia often measured their wealth according to the number of cheeses that they happened to have. The Romans used cheese as an army ration. It was regarded as an especially fine food. There are more than four hundred different cheeses known today.

The dairy industry is one of the most important in America at the present time. Owing to our laws and the desire of the people to have a good and clean milk supply, most of the milk sold in the market is pure and safe. Modern machinery makes it possible to produce dairy products on a large scale. Steam power in large plants and gasoline power on the farms



 now do the work that was done by men, horses, and dogs in former times. You must visit a modern dairy to understand how milk is cooled, bottled, and handled. Fast trains and automobiles bring milk to our doors from a distance of several hundred miles, and it is delivered in good condition to the household or hotel. It is now possible to find out easily whether or not milk is pure and to destroy bacteria, or germs of disease, by heating, or pasteurizing.

Although no single food may be regarded as a perfect food, milk is the most nearly perfect food eaten by man. There is no other single food that takes its place. It is therefore of the greatest service in helping mankind to be healthy.

Let us find out the reasons why milk is such a valuable food: (1) it contains the important elements necessary for growth, repair, heat, and energy, — proteins, fats, and carbohydrates; (2) it contains these in a fairly closely packed form; (3) milk is easily digested; (4) it contains important minerals and vitamins; and (5) it may be used with other foods. Milk is obtained at small cost. Everybody agrees that milk is one of the cheapest foods on the market. If we compare the value in calories of milk bought at the ordinary price with that of other foods, we find that about 100 calories of milk ( $3\frac{1}{3}$  ounces) cost just about half the amount that 100 calories of lamb or sirloin steak cost. Eggs and round steak usually cost even more per 100 calories than lamb or sirloin steak. One student of foods finds that a quart of milk selling



at 14 cents is really worth about 21 cents, if we think of its complete value as a food.

While most foods are rather poor in calcium, milk stands out as one of the richest calcium foods known. In fact, there are but two classes of foods which are rich in calcium. These are milk and leafy vegetables. You remember that unless the body is well supplied with calcium, the bones and teeth will be seriously damaged. You remember too that calcium can be used by the body only when the body is supplied with vitamin D.

Many foods are one-sided foods. They contain some things needed by the body, but lack other things. Whatever is lacking in potatoes, cereals, and meat, milk furnishes in abundance, for milk is a many-sided food. Because it protects our health in so many ways, milk has been called a protective food. Leafy vegetables also have the same name. Both milk and leafy vegetables furnish the body with substances that other foods lack. If I had not learned anything but the great value of milk and leafy vegetables from our study of foods so far, I should have learned a most important thing. Have you noticed that we are to have spinach for lunch? I am going to order a glass of milk and some spinach. Then I shall be eating two very important foods.

Although milk contains all the known vitamins, it is not rich in all of them. For this reason we should not depend entirely on milk for all the vitamins. The fats of milk, butter, cheese, and cream are





*An American milkman carrying milk in an up-to-date truck*

What is this man doing to keep his milk clean ?

especially rich in vitamin A. You know, vitamin A is necessary for growth. Ice cream is rich in vitamin A, and is one of the most delicious foods made from milk. Vitamin B is also found in milk, though not in sufficient amounts. Milk is rich in vitamin G, which prevents pellagra. It also contains vitamin C ; but this vitamin is partly destroyed when the milk is pasteurized, so that we need to have orange juice, tomato, cabbage, and lettuce, as well as milk, to get enough vitamin C. Some specially prepared milk has vitamin D added by passing it under the rays of an ultra-violet lamp or by feeding vitamin D to cows.

Those who know a great deal about foods have sometimes called milk the "elixir of life." The word *elixir* has an interesting history. In days gone by, men shut



*A Belgian girl carrying milk cans in a dog cart*

Collect pictures for your scrapbook showing milkmen from other lands

themselves up in laboratories and tried to find, by all sorts of experiments, a substance, or material, that would turn the baser metals like lead into gold. They named this substance they were hunting for, *elixir*. Of course nobody has ever discovered such a substance, but the word is in common use. When we call milk an elixir, we mean that it is a magic food and will do more than any other one food to help us grow and be healthy.

[As usual, Marian closed the talk:] Boys and girls, you have been listening to Richard Lewis in a talk over Station HHS on milk. Before leaving the classroom today, please don't forget to look at the pictures and posters on the wall. Perhaps you can add a few to our collection.





# THE HEALTH BULLETIN BOARD



CORNELIA HOFF

If milk is so good, I am going to be sure to have enough. The first thing I shall buy for my lunch today at Chew-Chew Inn will be a bottle of milk. Isn't this the proper way to begin every lunch? Let us all say, "Milk first."

*Sally*

I am collecting a fine lot of pictures of milk products for my notebook. Are you?

*Walter*

Here are some facts about milk. Can you add some more?

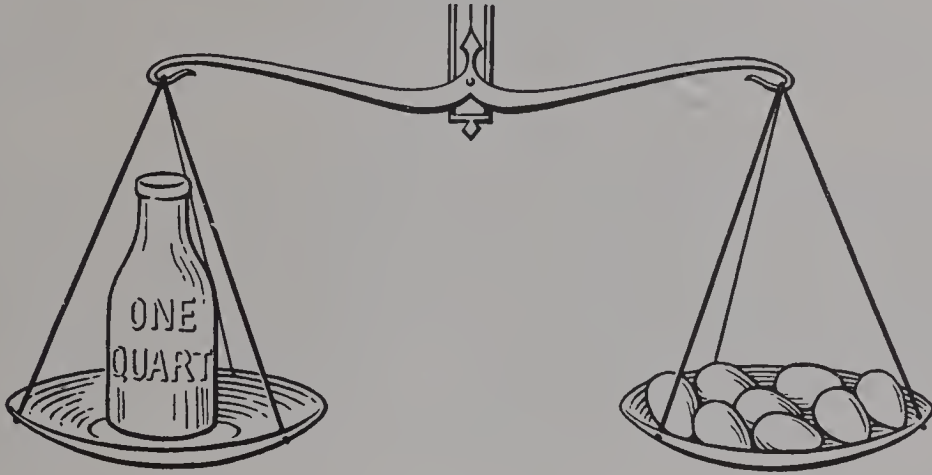
1. Milk is the most nearly perfect food.
2. Cheese is a valuable food.
3. Milk products are rich in all the food essentials except iron and vitamins B and D.
4. All the milk that we drink should be pasteurized.
5. It's a good plan for every boy and girl to drink about a quart a day.

*Alice*

Isn't this a fine clipping for my notebook? I am putting it on the bulletin board because I think you might like to see it and perhaps copy it in your notebooks. This shows what a famous scientist has to say about the fuel value of milk. Of course, milk has other values in the diet. Did you ever dream that milk offers so much energy and is really so cheap? When I showed this to mother and father, they were very much surprised. Father said,

"I think we had better order an extra quart of milk daily." I am going to find out the cost of all the things noted below. Maybe you would also like to work out the following prices.

*What is the fuel value of a quart of milk?* One quart of milk is about equal in fuel value to any one of the following:



1 quart of milk costing 8 or 10 cts. = 8 eggs costing 25 to 30 cts.

2 pounds of salt codfish.

$\frac{1}{3}$  pound of cheese.

3 pounds of fresh codfish.

$\frac{3}{4}$  pound of lean round beef.

2 pounds of chicken.

8 eggs.

4 pounds of beets.

2 pounds of potatoes.

5 pounds of turnips.

6 pounds of spinach.

$\frac{1}{6}$  pound of butter.

7 pounds of lettuce.

$\frac{1}{3}$  pound of wheat flour.

4 pounds of cabbage.

*What is the fuel value of a glass of milk?*

A glass of milk is about equal to { 2 large eggs,  
a large serving of lean meat,  
2 moderate-sized potatoes,  
5 tablespoonfuls of cooked cereal,  
3 tablespoonfuls of boiled rice, or  
2 slices of bread.

*Mary*

I drew a picture of a bottle of milk, on which I filled in with colors the fat, sugar, and protein elements of the milk in their proper amounts. Can you do that, too?

*Henry*

Let us take a trip around the world with milk. We can draw a globe and locate, in their proper places, the various milk-giving animals. Won't this be fun in our geography work?

*Betty*

I learned three new words in today's broadcast:

protection

elixir

pasteurize

How many were new to you?

*Harold*

Pasteurizing milk seems so simple. All we have to do is to heat it to 145 degrees Fahrenheit, keep it at that temperature for 30 minutes, and then cool it quickly. It is nothing more or less than an everyday operation in the kitchen, only on a large scale.

*Marjorie*

One of our neighbors says that she knows how important milk is in the diet, but her family don't like to drink milk. I told her that it could be used in many ways in her regular cooking and that it was just as valuable for health. I offered to make her a book of milk recipes, for which she was grateful. The first thing I suggested for the children was junket. She made some, and now the children call for it every day. I also told her about several kinds of milk soup. Have you any good recipes for my book?

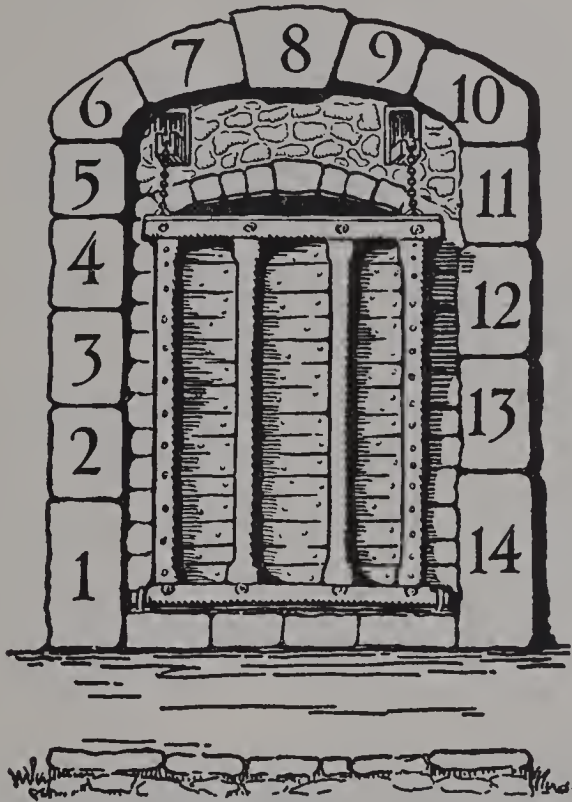
*Sarah*

Do you know that cows made us study botany? When pastures were eaten too close to the ground, the ancient tribes moved to fields where cattle could find food. Later many peoples learned to cultivate the soil, and so stayed in one place. Their first study of plants was made to improve the cattle fodder, or food. The Greek word *botane*, from which we get *botany*, means "plant."

*James*



Here is the entrance to Good Health Town.  
Guess the riddle, and the gates are down.



Put a letter in place of each figure :

1-4. The elixir of life.

5-10. What it aids.

11-14. What it builds.

*Dan*

## XVI

### *The Story of Grain*

BOYS and girls, this is Station HHS, broadcasting its regular health program."

It was Marian's voice introducing the second story of the series on the different foods. After the very interesting talk on milk the week before, everybody in Miss Leader's room was eager to hear another story. Many of the children were leaning forward in their seats to catch every word.



This morning, as we were saying the prayer which asks for "our daily bread," I thought about our broadcast this week. The word *bread*, as it was used long, long ago, meant not merely what we call bread but practically everything made from grains. I began to wonder how much of our food is cereal, or grain. I invite you to think about it. Make a study of the foods on your supper table tonight. I think you will be surprised to find out how many of them are made from grain, and how important grain is in the life of people. Usually, when there is a serious shortage of grain in any part of the world, starvation results. Our speaker today is going to tell us many interesting things about

grains, — things that may help us better to choose our foods. May I present Edgar Jaffe?

[*Edgar began:*] When we speak of grain we refer to the cereals from which we get our wheat, barley, and rye flours, and also our corn meal and rice. All these grains are the seeds of different grasses. They are called cereals, from *Ceres*, the Roman goddess of growing food plants. The principal source of energy in the world's food supply is these cereal grains. Raising the grains is one of the world's greatest industries. At the present time, cereals furnish 35 to 40 per cent of the food supply of the world. From them is obtained the flour with which to make bread, breakfast cereals, cakes, cookies, and puddings.

Since cereals are used so widely as foods the world over, they must contain much nutrition which the body needs. I am going to read to you from a table which tells what grains contain :

Proteins . . . . .	10 to 12 per cent
Carbohydrates . . . . .	65 to 75 per cent
Fats . . . . .	4.5 to 5 per cent
Water . . . . .	10 to 12 per cent
Mineral salts . . . . .	2 per cent

All grains contain about the same amount of nutrition, oats and corn being the exceptions. If you study this table, you will notice that grains have a large amount of carbohydrates, a fair amount of protein, and a small amount of fat. Of all the cereals, rice is the one which has the least amount of fat and protein.

The cereals contain very little of vitamin A and





*Models showing Egyptians measuring grain*

The overflow of the Nile left a rich layer of soil, which the Egyptians used for growing grain. What was the gift of the Nile?

☀ scarcely any of C and D. Science has recently found a way to add vitamin D to bread. The cereal grains are rich in some of the most important mineral salts, namely, calcium, phosphorus, and iron. Unfortunately, these minerals are found mostly in the outer portion of the grain, which is lost in the process of refining, or purifying, flour. The outer covering of the grain contains the important vitamin B and also much roughage, or cellulose. Acting together, vitamin B and the cellulose help the intestines to do their work. The outer covering of wheat is called bran. Some people, in order to get additional roughage, add a little bran to their breakfast cereal.

In our last broadcast we learned that milk is almost a perfect food because it contains nearly everything that the body needs. Although cereals are important



*Modern combine at work in a Western wheat field*

This remarkable machine cuts, threshes, and raises the grain into a truck

in our diet, they are incomplete foods when eaten alone. They should be eaten with other foods, less rich in carbohydrates but richer in fats and protein. Guided somewhat by appetite we have learned to do this. Notice that we make bread, rice, and tapioca puddings with eggs and milk, and eat bread with cheese or spread it with butter. We are in the habit also of adding cream or milk to breakfast cereals. Cereal foods are easily digested.

Of the various cereals, wheat flour is used most. How greatly we depend upon the grain from which our bread is made can be realized only when we are asked to use less of it. There is hardly any other article of food which one finds so hard to give up as bread, and many people would much rather give up meat. History tells us that from the very earliest times








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*An outdoor bake oven at Corinth, Greece*

Do you know how Americans baked bread before they used stoves?

 man has been accustomed to eat bread. At first the grain must have been found growing wild.

Weight for weight, but not bulk for bulk, bread must be regarded as one of the most nutritious foods. Three fifths of it is solid nutriment, or food, and only two fifths is water. We get more calories from bread than from any other food. Next to wheat, rye is the great bread grain of the world.

Many people like white bread and white flour. The more expensive flour is the whitest, and so white flour has come to be thought of by many people as the most desirable. This is not true, since important food elements are removed from the grain of white flour when



it is taken to the mill. White flour lacks not only minerals and cellulose but also the germ of the grain, which is the part of the kernel that is really alive. But that germ is rich in oil, and one reason why it is removed is that the oil in it often becomes rancid, or strong-smelling, and invites the attack of insects. This, of course, is a serious fault. Whole-wheat bread is better than white bread, if we are just thinking of the bread alone; but if we eat butter on our white bread, and if we eat vegetables and drink plenty of milk, the ordinary white bread is just as good.

Do you like rice? Most of us like the rice puddings that our mothers make. Rice is one of the world's greatest foods, and is so rich in carbohydrates that during the World War it was often used instead of potatoes. Most Americans do not eat rice frequently, but millions of people in India, China, and Japan live almost entirely on rice. These people have such energy as is scarcely to be found among those who live on other kinds of food. I think you know why they have this great power for work. It is because the large amount of carbohydrates in the rice furnishes so much energy. About 76 per cent of the rice is starch.

While rice-eaters are untiring in their work, they do not really have sound health. They are thin and withered-looking, and fall ill too easily. This is because their principal food, rice, is the poorest of all cereal grains in protein, fat, and minerals. Rice alone is an incomplete food. It should be eaten with eggs, butter, cheese, and milk. Can you tell why?

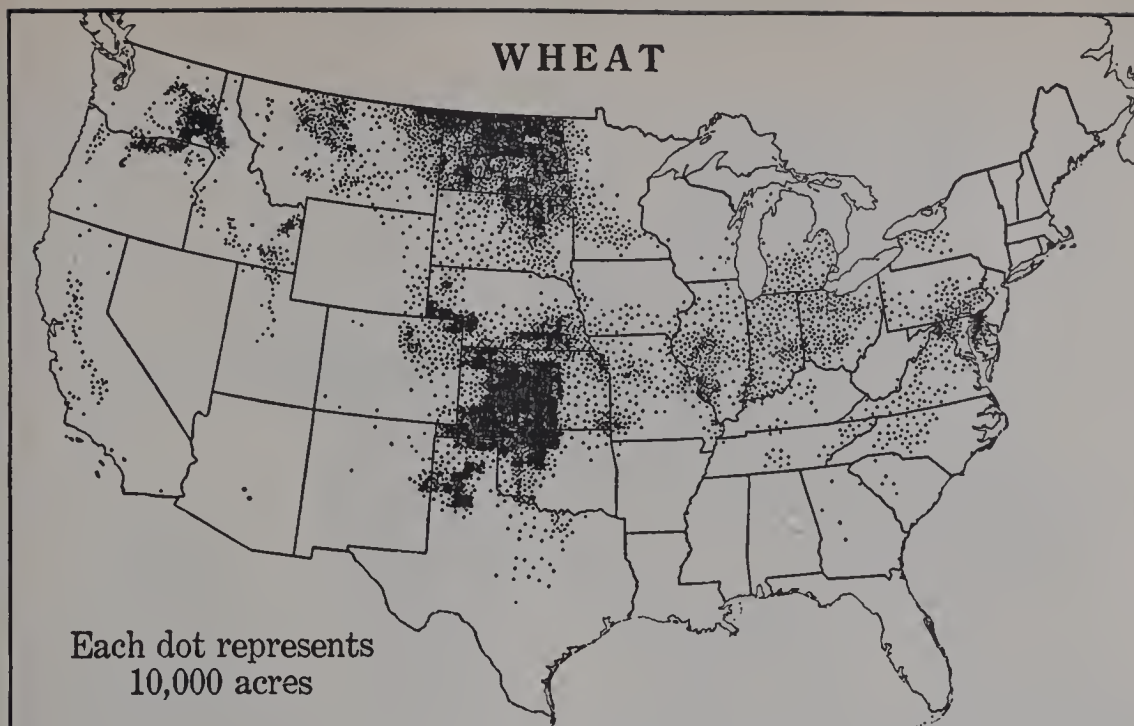




I am very fond of oatmeal. Are you? Perhaps you didn't know that oats are the most nutritious of all the cereal grains. They are rich in minerals, protein, and fat. The only cereal which can compare with oats in this respect is corn meal. It is fortunate that the husk of oats clings so closely to the kernel that it cannot be entirely separated from it by the ordinary grinding. Because of this, a great deal of vitamin B and cellulose are left in the oatmeal.

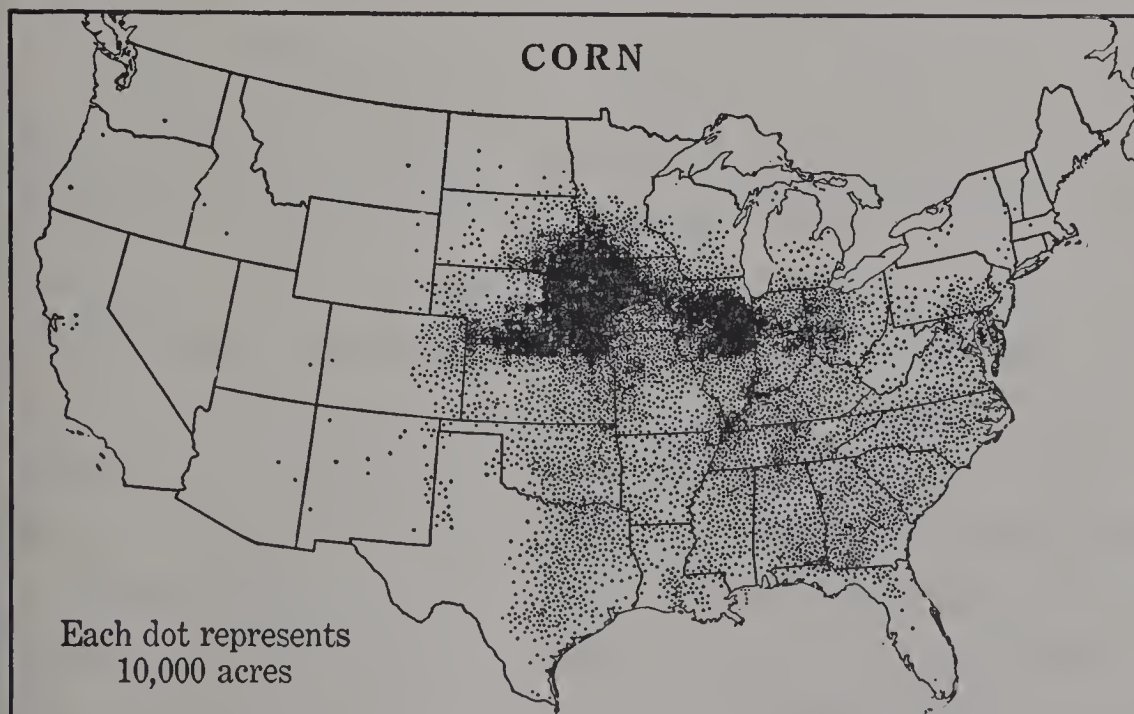
Like bread, Indian corn meal is really "the staff of life" to many nations throughout the world. It was a good thing for the early colonists in America that the Indians understood the growing of corn. Without their help many more of these early pioneers than did would have perished from famine. Shortly after the Pilgrims landed at Plymouth, friendly Indians brought them several bushels of golden corn, which the colonists began to use at once. The first winter on the bleak New England shores was a hard one for the Pilgrims, and many died because there was not enough food. But in the spring they had new hope. The friendly Indian, Squanto, showed the white man how to plant corn and how to fertilize the crop by putting dead fish into the soil. In this way corn early became a friend to the colonists in America.

Corn meal is quite as nutritious as wheat. It is richer in fat than any other cereal except oats. It contains twice as much fat as wheat or barley, and three times as much as rye. Corn-meal bread is just as good as bread made from wheat flour, and is better than



*Map showing wheat regions in the United States*

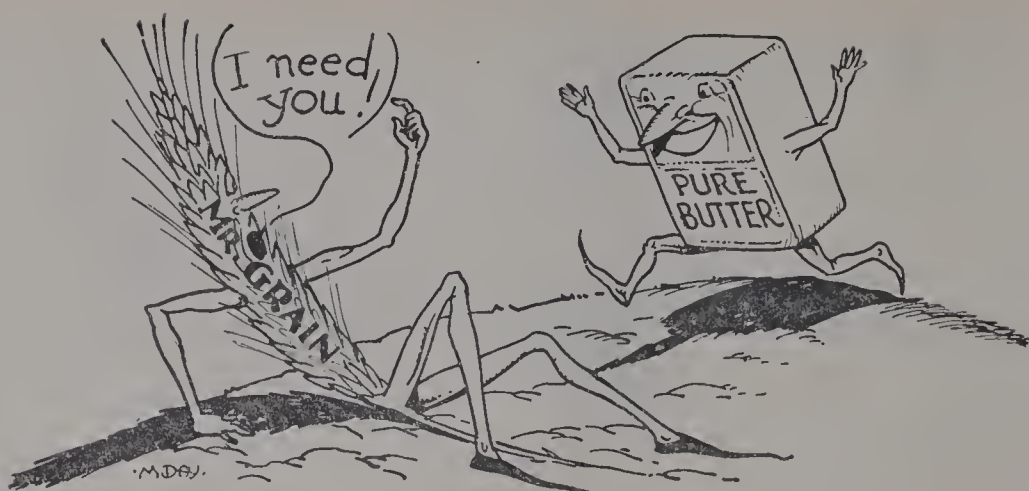
What states produce the most wheat? Is wheat raised in your own state? What makes wheat so valuable as a food?



*Map showing corn regions in the United States*

In what states is most of our corn grown? Why is corn valuable as a food? What foods served at your table contain corn?





*Why do they need each other?*



bread made from rye. Corn is prepared for food in many ways. In other countries people make it into a sort of porridge, while in this country we eat it on the cob or in the form of bread. Except for the fact that the yellow corn meal contains more of vitamin A than the white, they do not differ in their value as food.

Corn flakes and similar breakfast foods consist of cooked corn which has been treated with honey and then dried, rolled, and baked. These make a delicious, digestible, and nutritious breakfast food, especially when they are taken, as they usually are, with cream, milk, or fruit.

There is a special kind of corn which, when roasted, swells up and finally bursts. It is known as pop corn and is used not only as a sweet but as a nutritious food.

Our family doctor says that every boy and girl should eat a good breakfast before starting for school, and should also take plenty of time to eat it. I had milk and puffed rice with sliced peaches this morning. Oh, wasn't it good!



*The queerest grain bins in the world*

The natives in South Africa pack bags of grain in grass and put the bundles on posts, so that the grain will be safe from mice, rats, chickens, and pigs. How do American farmers protect their grain?

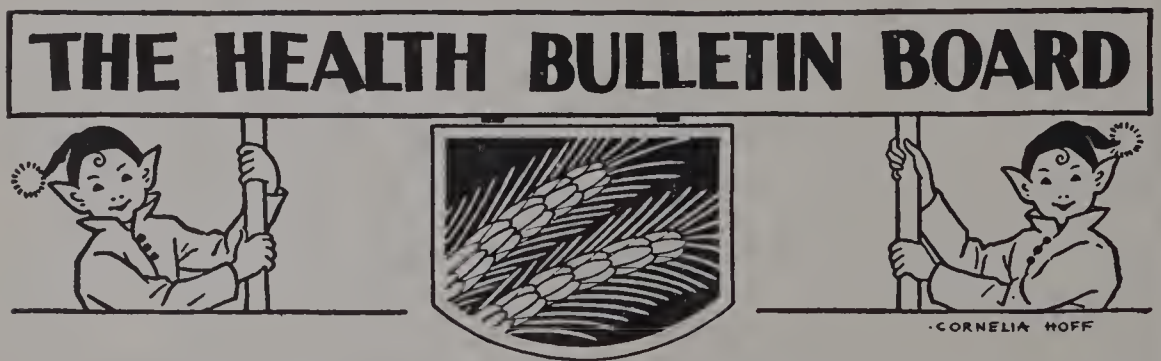
Remember that grain foods are very valuable in our diet, but that they are incomplete when eaten alone. Do you remember what we need to eat with them? When you go to the cafeteria today to order your luncheon, you may get some bread or muffins. What must you order also to have a meal that contains all the things necessary? If you can answer this question, you have learned the most important thing I have told you in this broadcast. It is one of the things that we must learn in order to be healthy. Good-by.



[*Marian then said.*] Boys and girls, you have been listening to a talk by Edgar Jaffe on the "Story of Grain." He has told you much about grains as foods, but there are many things that he could not tell you because he didn't have time. Perhaps you will have time to talk them over among yourselves.



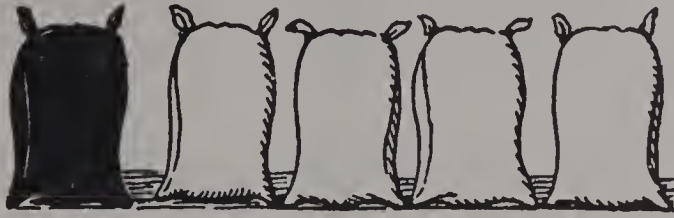
When this broadcast came to an end, there were a good many questions asked by the children about grain. Among them were "Could we live comfortably without grain as a food?" "Should wheat bread always be made from whole wheat?" "How much wheat do we export every year?" "Do we export any corn?" "How much barley do we raise?" "How much of it is used for bread-making?" These questions led them all to study their geographies and other books in their library.



I have found an excellent book on grains called "Our Cereal Grains" (Ginn and Company), by Nellie B. Allen. It has some interesting pictures that tell a great deal about the different grains.



Here is a picture I found in a magazine. Who would think that every fifth bag of wheat comes from America?



*United States      The rest of the world*

The world wheat crop



*Barbara*

Let us ask Miss Leader if we can spare the time to give some reports from Miss Allen's book.

*John*



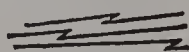
How many of these questions can you answer?

1. What happens in any part of the world when the grain crop fails?
2. How did cereals get their name?
3. What percentage of our food supply is furnished by cereals?
4. What food substances are furnished by grains? What are lacking?
5. What elements are lost in milling?
6. What do we need to eat with cereals to get a balanced meal?
7. Do you think it is necessary to eat whole-wheat bread? If not, what do we need to be careful about?
8. What is the value of corn meal as compared with wheat as a food?

Can you think of more questions?

*Alice*

This is the wheel which grinds our grains. There are six grains in the mill now. Can you tell which ones? You may use the same letters more than once to spell out the different grains. Which of the grains in the mill are raised in your state?



*Mary*

I learned several new words:

bran

refining

milling

germ

*Jean*

## XVII

### *The Story of Vegetables*

GOOD morning, Miss Leader."

"Good morning, James. It's a fine morning, isn't it?"

"Yes, Miss Leader. I was afraid early this morning that it might rain. That wouldn't make it very pleasant for our trip to the market."

"No, it wouldn't," said Miss Leader. "But see how bright the sun is now."

"Hello!" said Charles, coming into the room with his books. "Are we really going?"

"Yes, Charles," smiled Miss Leader. "Are you glad?"

"Indeed I am, Miss Leader. I like our regular broadcasts, but it's fun now and then to go on a little sight-seeing trip. Are you going to tell us something about vegetables while we walk about the market?"

"Yes, that is what the committee has planned."

So the usual program was changed. There was no health broadcast in the morning, and the children left school early in the afternoon to visit the market.

Miss Leader and her group wandered around through the great building, looking at the fresh green vegetables and delicious fruits.



"If we had been here very early this morning," said Miss Leader to the children, "we might have seen the vegetables coming into the market. That would have been fun. All the vegetables here are kept so clean and fresh that they look as if they had just arrived.

"As perhaps you know, a study made by our Department of Agriculture at Washington shows that vegetables form more than one fourth of the daily food of the American family. The world over, vegetables are eaten in large quantities. There are few peoples so savage that they do not raise some kinds of them.

"What an unusual variety of vegetables we find here! Some vegetables are valuable for their roots. Look around and tell me what some of them are."

"I know three!" cried John. "Turnips, carrots, and beets!"

"Correct, John," said Miss Leader. "Some vegetables are eaten because of their bulbs. The onion is one. Can you think of another?"

"Garlic," said Vittoria Rosatto.

"Yes," smiled Miss Leader.

"I have never seen any garlic. What does it look like?" asked Miriam.

"There's some," said Vittoria, nodding toward something that looked like a bunch of small dried onions hanging from a low beam.

"Some vegetables, like potatoes," said Miss Leader, "are valued for their tubers, or short, thick underground stems; others for their stems, as asparagus and celery; others for their leaves, as cabbage, let-



*A field of onions*

In what parts of our country are onions raised? Are any imported? Why are they valuable as food? How are they served in your school lunch room?

tuce, and spinach; others for their seeds, as peas and beans; and still others for their fruits, both green and ripe, as cucumbers, squashes, tomatoes, and melons."

Miss Leader and her pupils went on their way around the market, looking at the vegetables. So many questions were asked that they cannot all be given here; but this is what Miss Leader said:



If our vegetables could speak and tell us about themselves, we might learn that each has its story, and that



many of them have long held an important place among foods. Even the humble bean could tell how his kind had its beginning in western Asia, and how he has for ages been used as food throughout the world. He might say that there are one hundred and fifty varieties of him now cultivated in the United States. He might refer you to the string bean; the lima bean, whose native home is South America; the bone bean, which came from Scotland; and the soy bean, used in China and in Japan for making a sauce and also the delicious bean candy which all Japanese boys and girls like. He would surely mention dwarf beans, field beans, bush beans, and pole beans.

The bean would certainly say something of himself as food for cattle and hogs; and he would not forget to tell that baked beans are exported everywhere in cans. Indeed, he might even go back into history and describe the elections of ancient Greece, when beans were used as ballots by the voters, each man dropping either a white one or a black one into a helmet to indicate his choice.

The pea also would have his story, telling how he first grew wild in southern Europe and in Asia, and how once he was a common food of the ancient Greeks and Romans. He might say that he formed the principal food of the working classes in England before the potato was carried over from America; and he might tell that he is now eaten, both green and yellow, throughout the civilized world.

There are more than a hundred different varieties





*What does this map tell about your state?*

Where are most vegetables grown? Why? What vegetables are grown in your state? Which are brought in?

of cabbage, some red and some white, some small and some large, a single head at times as heavy as thirty pounds and big enough to fill a wheelbarrow.

The lettuce, another leaf vegetable, has been used in salads in Europe as far back as history goes.

Beets, carrots, onions, and turnips are among the oldest vegetables. The writings carved on the pyramids of Egypt show that such a great quantity of garlic, radishes, and onions was eaten by the workmen during the building of the pyramids that this food alone cost the rulers more than one million dollars.

Some of us eat beets nearly every day in a form we do not recognize. We spread them upon bread and butter in the form of beet sugar, and we are often eating sugar from beets when we eat candy.



*Cutting asparagus tips*

Asparagus is one of the most delicately flavored vegetables that comes from the garden. What value does it have as a food?

The story of asparagus, the early spring vegetable, is interesting. It was brought into our country by the Pilgrim fathers and is now grown from coast to coast. Asparagus is a plant of the lily-of-the-valley family. It contains iron and is rich in other minerals.

Celery is a native of Europe, but it is now cultivated widely in our country, especially in Michigan. So much celery is grown about Kalamazoo, Michigan, that this city is sometimes called "the celery city."

The tomato is such an important food product that it is canned in greater quantities than any other vegetable. During the World War, when oranges were scarce, it was discovered that tomato contains vitamin C. That

meant that tomato might be eaten instead of orange and grapefruit. That discovery saved many infants and children from developing scurvy.

Potatoes form an important part of our daily food. Early in the sixteenth century Spaniards returning from Peru carried with them the first potatoes ever seen in Europe. Although a food, they were first grown in Spain in flower gardens, as something strange and rare.

Sir Walter Raleigh received potatoes from some of his early colonists in America, and is said to have carried from his estates in Ireland the first potatoes to England to show them to Queen Elizabeth, recommending their use as food. Potatoes then became one of the chief crops of England, and they began to be grown in many other parts of Europe. The early use of the potato by the Irish gave it the name of Irish potato.

Spinach is without doubt one of the most important of the leafy vegetables. It is easily digested. There is scarcely any other vegetable which is so prized.

Water cress, which is a water plant whose leaves have a sharp, biting taste, parsley, and celery help the appetite. They are used as a garnish, or decoration, for such foods as roasts, fish, salads, soups, and sauces, and as additions to many foods that might seem rather tasteless without them.

Foods come from either the animal or the vegetable kingdom. One of the principal values of the vegetable foods is the large amount of carbohydrates which

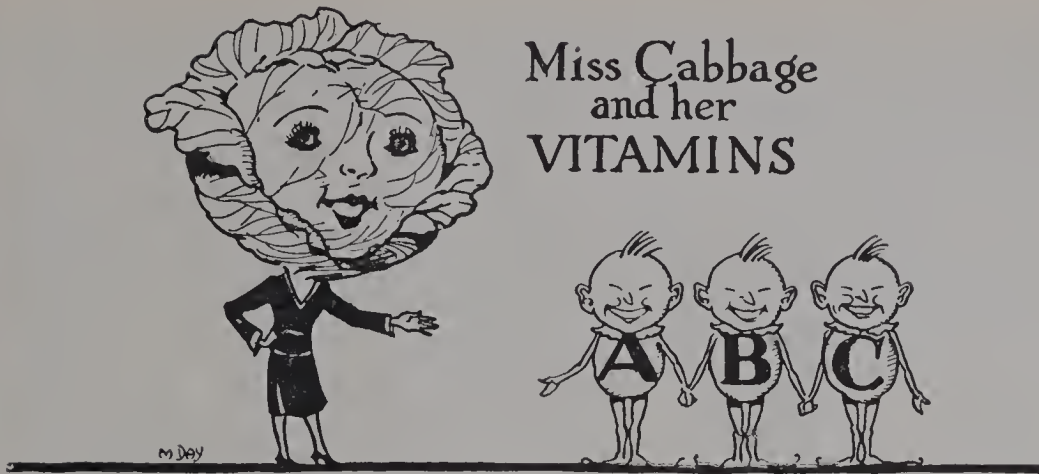


they contain. This makes them different from the animal foods, which, with a few exceptions, such as milk, contain little or no carbohydrate. Foods of the animal kingdom are rich in protein and fats, while products of the vegetable kingdom are rich in sugar and starch. Vegetables possess not only an abundance of carbohydrates (sugar and starches) for energy, and a small amount of protein and fat for growth, repair, and heat, but they contain also water, cellulose (roughage), and important mineral salts. It may be said, therefore, that vegetables contain more of the materials necessary to health than do foods from the animal kingdom.

There are three classes of vegetables which enter into our diet: those which grow above ground, those which grow below ground, and the vegetable fruits, which grow on vines.

It has been found recently that the eatable leaves of vegetables which grow above ground, chiefly cabbage, lettuce, spinach, a kind of cabbage called Brussels sprouts, endive, which is something like lettuce, dandelion greens, and kale, possess unusual health qualities. They are very rich in vitamins A, B, and C. Consequently these leafy vegetables should occupy a very important place in our diet.

There is a large amount of water in vegetables, much more than one would imagine. The body's water supply comes in large measure from vegetables. Even green peas and lentils, or beanlike seeds, which are richest among the more common vegetables in solid



*This popular lady introduces a famous trio*

substances, contain 78 per cent of water ; while in the leafy vegetables like cabbage water accounts for more than 90 per cent of the weight of the fresh food. This means that cabbage, for example, is really a more watery form of food than milk, for milk contains only 88 per cent of water. The seeming solidness of vegetables is deceiving. Their size is due to the large amount of cellulose. This cellulose, or indigestible matter, plus vitamin B, which vegetables contain, aids in making the action of the intestines regular. Like milk, leafy vegetables are protective foods, and daily use of them will make up for what is lacking in the average diet made up of cereals, starchy vegetables, meats, and pastries.

Furthermore, the great quantity of mineral salts, such as calcium, phosphorus, iron; potassium, and iodine, to be found in the water of leafy vegetables is important for health. Owing to their high content of alkaline mineral salts, especially potassium, green vegetables keep the blood and other fluids of the body

alkaline. That means that foods containing alkaline mineral salts help to lower the acidity of the blood due to the eating of acid-forming foods, like meat, eggs, cereals, and fats. Acids are substances opposite in quality from alkalis. Acids and alkalis combine with each other. There are acids in such substances as vinegar. It is necessary that mineral salts, so necessary to good health, be included in the diet. The water in which the vegetables have been cooked contains the mineral salts, and instead of being thrown away should be served with the vegetables, used in cream sauces, or kept for soup stocks. Steaming vegetables in a closed vessel or pot is a splendid way of saving the salts and the vitamins.

It is important that green or other vegetables eaten raw should be thoroughly washed before they are eaten, since bacteria, or the very, very tiny forms of plant life which sometimes cause disease, as well as unclean substances of all kinds, may cling to them. This is especially true of salads.

The second class of vegetables, as you have already learned, includes those which grow underground, and of which the white Irish potato is by far the most important. Other vegetables in this class are sweet potatoes, carrots, turnips, beets, a kind of cabbage called kohl-rabi, and onions. While this second class of vegetables does not furnish the body with some of the necessary health-giving materials that the leaf vegetables provide, it supplies more heat and energy, owing to its greater starch, or carbohydrate, content.





*Growing vegetables*

Within recent years vegetables as food have become much more popular. What makes vegetable food different from animal food? In what way do vegetables contain more material necessary for health than do meats?

In other words, what one class of vegetables lacks, another supplies. Good cooks know food values.

The most important mineral substance of potatoes is potassium. The potato, with the other underground vegetables, is the chief source from which our bodies obtain their supply of this salt.

The third class of vegetables, the vegetable fruits, includes the tomato, green pea, bean, lima bean, string bean, lentil,—the last five referred to as legumes,—pumpkin, squash, and a large variety of melons. The tomato is used principally for its vitamin C, in which

it is rich. Tomatoes picked green and ripened by time, and those grown in hothouses, contain less vitamin C than those permitted to ripen outdoors in the sun. The peas, beans, and lentils, — the legumes, — while rich in carbohydrates, are at the same time sources of considerable amounts of vegetable protein. They therefore have unusually high nutritive value, or, in other words, are very nutritious.

One may justly ask why vegetables are usually buttered or served with sauce containing butter, and why salads are served with oil dressings. Many vegetables are creamed; sliced hard-boiled eggs often garnish spinach; drawn butter is poured over asparagus, French dressing over salads, sweet cream into chopped cabbage, and so on. One reason is that they taste better that way. Another reason is that vegetables are rich in carbohydrates (starches and sugar), but poor in fats. These sauces make up for the lack of fat content in the vegetables and also increase their nutritive value.



"What's this?" asked Tom, running over to look at a peculiar kind of lettucelike vegetable.

Miss Leader smiled, but said nothing.

"I know," said Vittoria. "It is escarole. It makes delicious salad. I like it very much. I have heard that it is just as good for you as spinach, and in some ways even better than spinach."

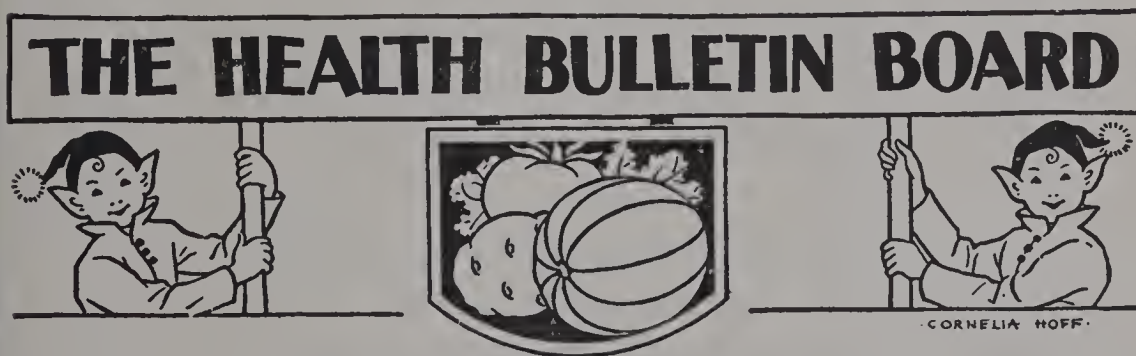


"You are right, Vittoria," said Miss Leader. "It is a rival of spinach. Escarole is especially rich in vitamin A. If we compare weight for weight, escarole is about as rich in vitamin A as spinach, seven times as rich as carrots, and forty times as rich as string beans, tomatoes, lettuce, peppers, and peas.

"Well," said Miss Leader, looking at her watch, "it is time for us to go home. Tomorrow I shall hope to hear more of your questions. Have you had a good time?"

"Yes, yes!" they cried.

"How much I have learned!" remarked Henry. "I have seen some new vegetables, — at least they were new to me, — and I know many new things about the old ones."



## Questions to Make You Think

1. Do vegetables contain much, little, or none of the following?

Protein (omit peas and beans)

Fats

Carbohydrates

Cellulose

Minerals

Water

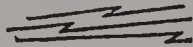
2. What do we usually need to eat with vegetables to have a balanced meal?



3. What vegetables are raised on the farms in our community?

4. Could we live without vegetables?

Try your hand at thinking up a few more questions, so that we can have a lively time discussing them at our next meeting.



*Charlotte*

How my notebook is growing! It begins to look like a scrapbook. Let me show you all the pictures I am collecting.



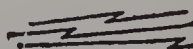
*Henry*

We had our dinner at a restaurant last night. I was surprised when the waiter brought us glasses of tomato juice to start off with. I had some. It was good. I asked the waiter why they served it, and he said, "Oh, doctors have discovered that it is good for the health." Do you know why?



*Betty*

It was mother's birthday yesterday, and father took us to the hotel for dinner. I thought I knew the names of nearly all vegetables. I was mistaken. I was introduced to two new vegetables. One was called broccoli, which looks very much like green cauliflower. The other was fennel, which was served in place of celery. It looked like celery. It tasted good, too. Try them for yourselves sometimes. Ask your mother to order them from the vegetable man tomorrow.



*Eleanor*

How are these vegetables bought (by the box, bunch, measure, pound, size, or can)?

Brussels Sprouts

Potatoes

Cauliflower

Asparagus

Celery

Tomatoes

Spinach

Peas

Carrots

*Marjorie*

# The Story of Vegetables

195

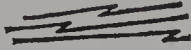
I learned two new words in today's broadcast:

alkaline

legumes

Which were new to you?

*May*



One reason why vegetables are important is that

1. They grow in the country.
2. Children like to watch them grow.
3. They furnish vitamins, minerals, and cellulose.
4. They have such queer names.

Which one is the correct reason?

*Barbara*

## XVIII

### *The Story of Fruit*

THIS looks as if we were going to have a broadcast on fruits this morning," said John, as he stood before Miss Leader's desk. On the desk were all sorts of fruit. There were apples, pears, bananas, oranges, lemons, and grapefruit. In cans with showy labels there were cherries, strawberries, peaches, and raspberries.

"Look at the dried fruits," said Nancy. "Here are prunes, dates, and apricots. And just look at these table raisins! We always have them for Christmas. Yum, yum, they are good."

A moment later Marian's voice was heard :



This is Station HHS with another health broadcast. You were all so much interested in the story of vegetables that I know you will be glad to hear about fruits. Who isn't fond of fruit? Every summer I visit my grandfather and grandmother out in the country. They grow all sorts of fruit, — delicious apples, cherries, grapes, and melons. It just makes my mouth water to think about them. Isn't it nice to know that fruit, which everybody likes, is a very good food?





*An apple orchard in bloom in the spring*

Where are most apples grown? Why are they especially valuable as winter food?

There is one pupil in our group who knows a great deal about fruits. She was born in far-away Italy, a land of sunshine, fruit, and flowers. When she left Italy she was old enough to remember it fairly well. Since she has been in America her father has kept a fine, up-to-date fruit store. Boys and girls, I take great pleasure in presenting Vittoria Rosatto.

[*Vittoria began her talk about fruits:*] Boys and girls, I thought I knew a good deal about fruits until I began to prepare for this broadcast. I have learned many more things since. I was always told that fruit was good for us, but I never knew just why. Today I want to tell some interesting stories about fruits.



*Picking citrus fruits*

Can you name some of the common citrus fruits? Where are they grown? Do they belong to the food or flavor fruits? What is their chief value in the diet?

☀ First I should like to tell you something about fruits in general and then something about particular fruits. We may think of fruits as being divided into two classes: the flavor fruits and the food fruits. The flavor fruits are those that are about 80 per cent water; the food fruits, those that are more than 20 per cent solids.

The flavor fruits include the citrus fruits, such as oranges, grapefruit, and tangerines. They are as pleasant to the taste as they are good for our health. They contain sugar and vitamins A and B, but chiefly vitamin C. Vitamin C, you remember, prevents scurvy



and helps to make firm, healthy gums and sound teeth. Because they are so full of water, they are eaten in large quantities in warm countries. When used in fruit drinks such as lemonade and orangeade, they give us the benefit of more water and sugar in addition to the vitamin.

The food fruits have real nutriment. Bananas, dates, figs, and raisins are food fruits. Not only do they contain much carbohydrate, but they also have small amounts of protein, which is useful in building and repairing the body. Weight for weight, the fruits that are dried are more nourishing than bread. A pint of milk and six ounces of dried figs, dates, or raisins make a good meal for people who work indoors.

The amount of cellulose differs greatly in different fruits. The eatable part of the orange has very little, but the eatable part of the pineapple has a great deal. Those fruits that have much cellulose are usually better when cooked, for cooking softens the cellulose. The same thing is true of vegetables containing a good deal of cellulose.

It is very important that fruit should be thoroughly ripe before it is eaten. As fruit ripens, the amount of sugar in it increases and the amount of cellulose becomes less. All of you know the difference between the sour taste of a green apple and the taste of an apple that has ripened slowly in the sun.

The mineral salts in fruits are very valuable for health. They are changed through digestion into alkaline salts. As Miss Leader told us the day







we went to market, our blood and the other fluids of the body need to be alkaline if we are to keep healthy. The blood needs to be alkaline to carry carbon dioxide to the lungs, where it is thrown off. Since fruit helps bring this about, you can see how important it is to include fruits in the diet.

Everybody enjoys the flavor and the sweet smell of fruits, but not everybody knows that these flavors are due to oils found in the skins of the fruits. Apples and pears soon lose their delicious flavor when they are pared and left for a time. Although the pleasant fruit flavors do not build bones or furnish energy, they do help to give us an appetite for other foods. And you all know that if you enjoy your food, you will digest it easily.

Suppose we stop for just a moment to think of some of the reasons why we ought to have fruit in our diet:

First, many fruits contain large quantities of water. We need water daily in our diet.

Second, fruit contains sugar. This sugar is easily digested and furnishes energy quickly.

Third — oh, I think I'll stop here and ask you to discuss the other points in your next health-work period. Then you can copy all these reasons in your notebook.

That is all I have to say about fruits as a whole. Now let me tell you some interesting things about particular fruits and about the great fruit industry.

Not many years ago fruit was considered a less important article of food than it is today. Only a few

fresh fruits, such as apples, lemons, and oranges, could be kept for any length of time or be sent very far from the place where they were grown. Dried fruits, such as dates, raisins, and prunes, were the only fruits that could be exported.

Drying fruits is a method of preserving that has come down to us from ancient times. Very early in the history of man — nobody knows how early — someone found that he could keep fruit by drying it. An old, old record tells us that King David of the Hebrews accepted raisins in payment of taxes. Another record, drawn up in Babylonia 430 years before Christ, tells us of a debt to be paid in dried fruits. Even today many farmers dry their own apples. It would be interesting to find out at a grocery store how many dried fruits the grocer has for sale.

Today, with cold-storage arrangements and swift trains and ships, fruits may be kept fresh as they are moved from one part of the world to another. America, Australia, and South Africa now ship apples, pears, and plums to Europe; and Europe sends back dried figs, raisins, and seedless grapes. California sends oranges, lemons, peaches, and pears to New York and other cities on the Atlantic seacoast, and the states of Washington and Oregon give our Eastern cities some of their most delicious apples. Florida sends grapefruit to the North, and Georgia's peaches are ready to ship long before peaches are ripe in the Northern states. When Boston is wrapped in snow and ice, her citizens who can afford them may have fresh straw-








*Drying figs in Portugal*

Figs have a high food value. Turn to page 38 and find out the number of calories in one fig. What other foods have about the same number of calories? What other values besides calories do figs have?

 berries that have been sent in refrigerator cars from the South. In our city markets today we may buy fresh fruits at any time in the year.

One of our most common fruits is the apple. It keeps longer than any of the others. People like it the year round. It is one of the oldest fruits known.

The apple was brought to America by our forefathers, who planted orchards almost everywhere they stopped as they pushed westward. Have you ever heard of Johnny Appleseed? He was a queer fellow who had much to do with starting the first orchards of Pennsylvania and Ohio. His real name was Jonathan



Chapman. He was born in Boston in 1775. When a young man, he went to live in western Pennsylvania, which was then a wild forest country without homes. He somehow got the idea that it was his mission to give apples to the people, and he began to plant apple seeds wherever he could. In 1801 he drove westward into Ohio, carrying a wagonload of apple seeds which he had gathered in Pennsylvania. He picked out fertile spots along the streams to plant his orchards. The Jonathan apple was named after him, and the people of Ohio erected a monument to him.

China is the home of the peach. It came by way of Persia to Europe, and thence to the United States. Today American-grown peaches are far better than those that come from China. Because of our refrigerator railroad cars and cold-storage plants we may have peaches for four or five times as long a period each year as in the past. Peaches are grown not only in the Southern states but in some of our Northern states which were once thought too cold. Today Connecticut is one of the chief peach-raising regions of the country.

More important than any other of our orchard fruits, excepting the apple and the peach, is the plum. The large, sweet plums are used for prunes. We produce many millions of pounds of dried prunes every year. They are one of the foods that we export to other countries.

In the making of prunes the fruit is picked by hand and carefully washed in warm water. All the imperfect plums are taken out, and the remainder





are sorted according to size. They are then spread out upon long wicker trays or boxes about a yard wide and set in the sun for a week or longer to cure. Several times a day men go about and stir the plums, rolling them over and over, so that the heat of the sun can go through and through the pulp and cure them evenly on all sides. When they are thoroughly dried, they are taken back to the packing houses. Here they are again sorted and graded and packed in boxes, by machinery and by hand, and shipped to the markets.

The apricot resembles both the peach and the plum. The apricot tree is like the plum tree, but the fruit when ripe looks like the peach. The apricot is supposed to have come from China. It was carried to Europe from Asia by Alexander the Great, and centuries later was brought to America. It grows well in our Pacific-coast states, especially in California. The fruit is excellent for drying and canning, and in these forms it is shipped all over the world.

The pear is a native of Europe. It was first brought to the United States about 1630, when a pear tree was planted near Governor Endicott's house in Boston. The pear, like the apple, will keep a fairly long time; and, like the peach, it is delicious when canned.

Cherries are very generally grown in our country. They are delicious when eaten fresh and are especially valuable for canning and preserving. They are raised in large quantities in Europe and also in Japan and China. The Japanese have certain varieties of cherries which they cultivate for their flowers only. In cherry-



*A vineyard in far-away Rumania*

In what ways are grapes used as food? Does some of our supply still come from abroad? Where are grapes raised in America? Why are they valuable in the diet?

blossom season the Japanese hold picnics under the trees, and the boys and girls, as well as the older people, write verses about the beauties of nature and tie them to the cherry-tree branches.

Plums, apricots, pears, quinces, and cherries may be found fresh, dried, or canned in every American market. The pear, the cherry, and the applelike fruit called the quince are also preserved in large quantities.

I think you will be interested to know something about grapes. The state of California has more than one hundred million grapevines, and it raises enough grapes in one year to give about ten pounds to every man, woman, boy, and girl in the United States.

America's first attempt at cultivating grapes







was made in Virginia in 1610 by a Frenchman, who planted a vineyard at Jamestown. Two hundred years later, when Thomas Jefferson was president, Congress gave a grant of land to some immigrants from Switzerland who wished to try growing grapes along the banks of the Ohio River.

By means of special kinds of refrigerators we are able to enjoy grapes during the greater part of the year.

There are certain varieties of grapes that are particularly good for making raisins. Until fairly recently all the raisins used in the United States were imported from Europe. They came from the warm countries along the Mediterranean Sea, especially southeastern Spain, a region which is noted for the Malaga grape and which is today one of the world's important raisin-producing districts. When the people of California first tried to dry raisins, they were not successful. They did not know what grapes to use or just how to cure them, but they sent men to the Mediterranean countries to learn the best methods of raisin-making, and today our raisins are as delicious as any in the world.

We have many small fruits which are grown in large quantities. Some of these are eaten fresh; others are dried, canned, or made into jellies and jams. Chief among them are strawberries, blackberries, raspberries, blueberries, currants, and cranberries, all of which, with the exception of cranberries, are to be found growing in almost every part of the United States.

Have you ever visited the Blue Ridge Mountains? If you go there at the right time, you may have for the picking all the blackberries and raspberries you can eat.

We have one berry which is odder perhaps than any of the others. It is about the size of a cherry, and so tart that if cooked without sugar it sets our teeth on edge. It always makes its appearance upon our tables at Thanksgiving and Christmas, being used as a sauce with roast turkey or chicken — cranberries, to be sure.

Cranberries grow wild in some places and, in others, upon cultivated vines. More than half of our crop is now raised in Massachusetts, and about one fourth of it in New Jersey. Indeed, Massachusetts, New Jersey, and Wisconsin grow more than 90 per cent of these berries. The reason why the cranberry is grown in so few places is the peculiar conditions necessary to cranberry culture. Have you ever seen any other farm so odd as a cranberry farm? The land chosen must be low and swampy and so situated that the vines may be flooded at certain times of the year.

Among the delicious fruits that come to our tables, what is finer than a large yellow orange full of juice or a grapefruit cut in halves? On a hot day there is nothing so cooling as a glass of iced lemonade. Our chief orange, lemon, and grapefruit regions are in Florida and California.


Pineapples and bananas are two fruits of warm climates. One grows on a stalk in a way not unlike a cabbage, and the other grows in great bunches





*A field of pineapples*

The pineapple is one of our most delicious fruits. Where is it grown? Does it contain much or little cellulose? Why is cellulose desirable in foods? Look over your magazines to find pictures of pineapples and other fruits to cut out for your notebook


 on a treelike plant which shoots up to a height of fifteen feet or more. Nevertheless, the first of these fruits is one of the most delicious, and the second, one of the most useful, known to mankind. Pineapples are raised in the West Indies and in the Bahamas for export to the United States, and are also sent from our Hawaiian Islands. Some are raised in Florida and California.

The largest banana plantations of the world are found in the West Indies, Central America, Colombia, and Mexico. When bananas are harvested, the bunches are cut while the fruit is still green. There is not a ripe, or yellow, banana among them. The fruit is still green when taken off the boats in some northern port,



and does not turn yellow until about the time it reaches the markets and fruit stands. Bananas will keep easily for ten or twelve days. They are cut green in order that they may stand the journey to all parts of our country. In many parts of the world the banana forms the principal food. It is eaten in all tropical countries, and some savage and half-civilized people have, at times, little else.

The plantain gives the native of central Africa not only food and drink but clothing, string, and his substitute for soap. He eats the green fruit of the plantain, which is closely allied to the banana, cooked as a vegetable, and the ripe fruit as a dessert. With him it may be said that the plantains take the place of wheat and corn, for he steams the fruit and makes it up into flour. He uses plantain leaves to thatch his house, and makes them answer the purpose of paper. The stems are sometimes made into fences, and the pith, or loose, spongy tissue inside, is scraped out and used as a sponge. The fibers form excellent string, and they are also woven into sun hats and shields.

As a food the banana is one of the cheapest and most nutritious among the fruits, and is rich in carbohydrates and vitamins. It may be used in various ways for dessert. Some people have a mistaken idea that bananas are difficult to digest. This is true only when they are eaten before they are ripe. When bananas are thoroughly ripe and fit to eat, the peel is yellow flecked with brown. Then a large part of the starch in the fruit has been changed into sugar. 

There is one great advantage which the banana has over many other fruits. It has a safety covering which protects it from flies and dirt. One can peel a banana and eat it without washing it. It is not safe to do this with most other fruits bought at fruit stands.



Marian's voice was then heard telling the boys and girls of the W. T. Room that this closed Vittoria's helpful talk on fruits. She said that she felt sure they had all thought of many interesting questions for the discussion period. Talking about fruits, she remarked, made her hungry. She almost smacked her lips as she said she would have a big fruit salad for supper.



I prepared these incomplete sentences. Copy them in your notebooks and try to complete them. Prepare some sentences for me to complete.

1. Fruits are valuable because they contain ----- and -----.
2. ----- fruits prevent scurvy.
3. Chilled orange, -----, and grapefruit juices make healthful hot-weather -----.
4. ----- in fruits furnishes energy.

*Betty*

I learned these new words in today's broadcast:

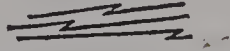
refrigerator

plantain

carbon dioxide

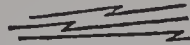
How many were new to you?

*Helen*



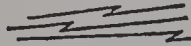
I never knew until today why fruits are served at the beginning of a meal. They are served then because they improve the appetite.

*Eleanor*



Fruits are useful in clearing the intestines, because they contain vitamin B in abundance. Dr. Amster, our family physician, explained that to me.

*Doris*



From what Vittoria told us, I should imagine that fruit jams and jellies are better energy foods than cheap candies. From now on I am going to spread them on my buttered bread.

*Peggie*



## XIX

### *The Story of Nuts*

GOOD morning, boys and girls," said Marian. "I have a great surprise for you this morning!"

"Oh, what is it?" asked a dozen voices. "Are we to have something different for our health period?"

"That's a good guess," said Marian. "Yes, it is something about the health period. Perhaps you know that Charles Watson was to give the broadcast today about nuts.

"Well, Charles came in this morning and told Miss Leader that the beautiful fall weather we're having has ripened the nuts on the trees. Charles's parents have a big farm out in the country. They have many nut trees, and there are many more nuts this season than they can use. This morning Charles brought us an invitation to visit the farm and go nutting."

It's easy to imagine how delighted the children were, for they were all very fond of the country.

"Miss Leader has arranged the program so that we shall have no broadcast today. That will let us out early enough to go. While we are on our trip, Charles has promised to tell us what he has learned about nuts. Miss Leader will take some of us in her car, and Mr. Watson will have room for the others in his truck."

So it happened, early in the afternoon, that all the children started for Mr. Watson's farm to gather nuts. What a ride it was through the country! The leaves were golden, brown, and red. The pumpkins were yellow in the fields. Farmers were busy husking corn and doing their fall work.

At last the children reached Mr. Watson's farm. After having a drink from the kitchen well and eating some big red apples that Mr. Watson offered them, they started down the long lane to the woods with their bags in their hands.

"Perhaps you know," said Charles, "that in the days of our grandfathers nuts were eaten as a treat, just as candy is eaten now. I was reading a book about Washington the other day. Washington liked to sit by the fireplace in the evening, cracking nuts and telling stories. Today we know that nuts are very valuable as food. Many of our mothers keep boxes of nuts in the pantry to use in cooking.

"Of course you know that these are chestnuts," said Charles, pulling two or three out of his pocket. "Not many years ago our farm, Old Acres, had many chestnut trees, but a blight came, and they sickened and died. Nobody knew what to do to stop the blight; so it spread until nearly all the chestnut trees in this part of the country have been destroyed. The chestnuts we get here now are shipped in from other parts of the country, and many of them come from Italy.

"Among all the nuts the chestnut is probably the most valuable as a food. It has a large amount of

carbohydrates and about as much protein and fat. In certain parts of Europe chestnuts are grown in orchards. An acre planted to chestnut trees will produce more food, it is said, than the same amount of ground planted to any other crop. The great value of the chestnut is well known to the poorer peasants of France. During the autumn and winter they often make two meals a day from the chestnut alone. They prepare the nuts by removing the outer shell, blanching them, which means making them white by removing their skins, and then steaming them; then they add salt and milk when they eat them. Sometimes the nuts are ground after blanching, and the nut meal is made into flat cakes. There are regular chestnut peddlers, too, who carry the steamed and roasted chestnuts through the streets and sell them to the working people for breakfast."

"Look! Oh, look!" cried Alice. "There is a nut tree now!"

"Yes, it's a hickory-nut tree," said Charles.

"See the gray squirrel sitting on that branch," said Walter. "I think he is eating a nut."

"Fill your bags, boys and girls," said Charles.

Soon they had picked up all the hickory nuts under the tree. Then they threw big sticks up into the branches and watched the nuts fall to the ground.

"We may find a few walnuts," said Charles, "but they are rather scarce. The wood of the walnut tree is so much used for making furniture that few of the trees are left. Most of the walnuts in the markets are





*Budding an English-walnut tree*

Walnuts are so much desired as food that they are grown in orchards in different parts of our country. What kinds of nuts does your mother use in her cooking? What can you say about their fuel value? Is eating nuts between meals a good habit? Give reasons

English walnuts. Many come from California. I have read that in some of the walnut orchards planted there forty or fifty years ago there are trees that are two feet through and that have a spread of over eighty feet. In some of the old missions there are trees that are over a hundred and fifty years old and four feet through. Within the last fifteen years the amount of walnuts used as food has increased 100 per cent. Only about one half of the walnuts that we use are grown in America."

"Here are some nuts that my mother put into my lunch box," said Roy. "Perhaps you can tell us about them."

"Yes, they are pecans. A pecan is a little like a hickory nut. The raising of pecans has become quite an industry in our Southern states. The United States grows most of the pecans that are grown. People have liked the pecan so much that great orchards have been set out, and the planters have made every effort to improve their product. There are about 5,000,000 pecan trees in the United States, and each tree yields an average of about six pounds a year. Although it is a big business, it is not yet big enough to supply the demand.

"Pecans are good food, because they are rich in oil, protein, iron, and vitamins. They can well take the place of meat. A pound of pecan meats has as much nutritive value as two pounds of pork chops, three pounds of salmon, two and one half pounds of turkey, or five pounds of veal. They are excellent as dessert too. About 70 per cent of pecan meats is oil which can readily be digested. My mother uses pecan meats for cakes, bread, salads, and other dishes."

"Isn't that another kind of nut tree?" asked Miss Leader, pointing to a tree some distance away in the woods.

"It looks like a butternut tree. There aren't very many butternut trees. It's a pity, because the nuts are delicious. Let's run fast and see who will be the first to get there."



No sooner had Charles said this than they all raised a shout and started on the run. What fun it was! Towser, Charles's dog, had a great time chasing rabbits and squirrels, but they were all too swift for him. Finally, as the sun touched the tree tops, the children started down the lane for the farmhouse. They were tired but happy, and were beginning to think how good their supper would taste.

"I have some roasted peanuts left in my lunch box," said Mildred. "Charles, you haven't told us a thing about peanuts. That must be an interesting story."

"It is," replied Charles. "We all like them, especially at the circus and ball games. Have you ever wondered how the peanut gets its name? It is really a ground pea with the taste of a nut. It has a pod like a pea, but the pod or shell grows on the stem of the plant under the ground. Really peanuts are vegetables. They are cultivated in the same way as potatoes and corn.

"The peanut was first found in Brazil, but is now grown in many warm countries, such as China, parts of Africa, and the Philippine Islands. Most of our American peanuts come from the Southern states. North Carolina ranks first, with about one fourth of the country's crop. Virginia, Alabama, Florida, Texas, South Carolina, and Tennessee are the other main peanut-producing states. In the United States alone about a million acres are planted to peanuts every year.

"Probably no nuts are so widely used for food as peanuts. They are not only eaten from the shells when



they are roasted, but they are also used as blanched or salted peanuts, ground into peanut butter for the table, and made into peanut meal and flour. Our clever cooks have found over a hundred ways to use peanuts as food. Peanuts may go into the making of soups, breads, cakes, salads, and cookies; and they may substitute for meat dishes and sweets. The oil which is pressed out of peanuts is often used in place of olive oil, either alone or with other oils.

"You know that nuts have a very high food value. In that they are quite different from fruits and vegetables. Bulk for bulk, nuts are among the most nutritious foods we have. It has been said, 'No man need starve on a journey who can fill his pockets with almonds.'

"Nuts not only have a good deal of the great nutritive substances, fats, proteins, and carbohydrates; they also have vitamins A and B, mineral substances, phosphorus, and calcium. Nuts contain about 50 to 60 per cent of fat. No other vegetable or fruit substance is so rich in fat. This has led manufacturers to make nut butter and sell it as a substitute for butter, but no vegetable fat can be so digestible as butter fat. Nuts are excellent in the diet with fruits and vegetables.

"There is one warning to give you about nuts. When eaten in large quantities they are not easily digested in the stomach. This is partly because they are so rich in fat, and partly because they contain so much cellulose. They should therefore be chewed very well. They are even easier to digest when they

are ground up and the pulp is used in cooking such things as cookies, cakes, and dressings for turkey, fish, and meats.

"One mistake that is often made by both children and older people is that of eating large quantities of nuts between meals and with no other food. They may cause a serious stomach upset. It is better to eat them with the regular meal or for dessert.

"I am sorry that there isn't time to tell you about some other nuts. Don't forget that all together they make one of our most valuable foods."

"That was fine, Charley," said Donald. "I have learned a lot. I shall go home with a great deal to tell mother. She is always so much interested in our broadcasts."

"Three cheers for Charley!" shouted William, and they all yelled so loud that some of the cows in the lane began to moo and run for the barn.

"Many, many thanks for all the nuts, too," said Marian. "Every time we crack some of them around the fireplace in the evening, we shall think of you."

When the children reached the farmhouse, Mr. and Mrs. Watson had a big fire in the fireplace and something hot for them to eat and drink. The warmth seemed good, for the evenings were beginning to be chilly. What a jolly time they had! The harvest moon was shining when they started for home.

"Don't forget to come again next year when the nuts are ready," said Charles.

"Thank you! Thank you!" the children cried.

**THE HEALTH BULLETIN BOARD**

I asked mother tonight to give me a hint for my notebook. She said "You might write me a letter telling me what you learned on your trip about the value of nuts in the diet. I should like to get the letter, and you might like to put a copy of it in your notebook." Isn't that a good idea?



*Hilda*

In how many ways may we use nuts in our food? Mother has asked me to collect a book of recipes in which nuts may be used. I have found several in newspapers and magazines, and I have also been able to get some from our neighbors. I am putting these recipes in my notebook. I should be pleased to get a few from you.

*Dorothy*



## XX

### *The Story of Meat, Fish, and Eggs*

THE broadcast this morning is to be on the subject of the animal foods," said Wilson. "I am very much interested to hear more about them. There is a man living near us who says that he never eats meat, fish, or eggs. He says that those foods are not only unnecessary but really harmful. He seems to be in good health."

"My mother says that many people eat too much meat," said Alice. "I wonder what the broadcaster will have to tell us."



This is Station HHS in its weekly broadcast on health, Marian Hall announcing. Boys and girls of the W. T. Room, this is the last of the broadcasts on the stories of food.

So far as we know, men have always depended upon animals for food. In our study of milk we found that in the earliest days of man's history the cow was of unusual importance. Before the beginnings of civilization man had learned to domesticate such animals as cows, pigs, and the ordinary barnyard fowls.



This made him less dependent upon hunting than he had been. In recent years great industries having to do with the production of animal products have grown up in our own country. But I must not tell you any more about the very interesting things that I have read. Somebody else too has been reading a great deal on the subject. I take pleasure in presenting Edward Brooks, who will speak to you on the subject "The Story of Meats, Fish, and Eggs."

[*Edward began:*] Let us use our imagination for a while this morning. The scientists tell us that thousands and thousands of years ago men had not yet discovered how to use fire, build houses, make weapons, or domesticate animals. When it stormed they sought protection under the wide branches of a tree, against a tilted rock, or possibly in caves. They must have lived largely on wild fruits, nuts, roots, and herbs. Probably many of them lost their lives by eating foods that were poisonous. Little by little they learned many things that were helpful to them about these foods. Man at first, you see, was probably a vegetarian; that is, he ate only plants. I think this proves that it is possible to live without meat. If you think for just a moment about the foods man had, you will realize that he had a well-balanced diet.

Of course, even in this very early time he found birds' eggs. It is easy to suppose that once in handling eggs he broke one, and that he put his fingers wet with the egg into his mouth. The substance tasted good, and he began to search for eggs, which he ate raw.



*Buffalo stopping an early train crossing the plains*

Later, to save himself the trouble of hunting eggs, he captured some wild fowls and kept them for their eggs. This brought about an important change in his diet. It also made life easier for him. Today egg production and poultry-raising are so important that they form one of America's greatest industries.

In the same way early man probably learned by accident to eat meat. Perhaps, half starving, he came upon a deer or a buffalo that had been killed. He may have tried to eat its flesh and liked the taste so well that afterwards he ate of every creature he found that had recently been killed. He must have soon learned by sad experience that an animal too long dead was unfit to eat. Little by little he invented traps and pits to catch animals. In certain parts of wild Africa







today the natives build a V-shaped kind of fence leading to an encircled field. Then vast numbers of natives make a circle in the forest and move slowly inward toward the V-shaped fence, pounding their tom-toms, shouting, and making every possible noise to drive the deer, buffalo, or other wild animals before them into the inclosed field, or corral. After this "beating of the forest," as it is sometimes called, the animals are killed and there is great feasting.

If we go back to the time of the Pilgrim fathers or of the pioneers who carried the flag of the Republic westward to the shores of the Pacific, we notice that they depended largely on hunting for their food. In those early days game was plentiful. The first trains across the great plains often had to stop for several hours to allow herds of buffalo to cross the tracks. Later the settlers found that the grassy plains would furnish food for cattle and sheep. Thus began that picturesque life of the plains which was so thrilling. The Western plains still raise most of the cattle and sheep of the nation. Chicago is the center of the greatest meat-packing industry in the world. The Mississippi Valley and the great Middle West are noted for the raising of hogs.

Early, or primitive, man must have learned by accident to eat fish and shellfish also. As his curiosity and hunger led him to seek new foods, he may have tried, for example, to eat a clam which he came upon along the shore. Finding it satisfying, he added rather easily to his food supply by digging in the mud. Such shell-



*Digging oysters*

These shellfish are a popular food. They are grown at the bottom of the sea. Do you know one way in which sea food is more valuable than pork or chicken?

fish were very popular with early man, for we find along the shore of the North Sea great mounds of shells left by man long ago. Among the shellfish sold in our markets today are oysters, clams, lobsters, and crabs. The present demand for oysters is so great that they are protected and cultivated in many places. After the oysters have grown, thousands of men dredge the sea bottom to bring them up. The center of the industry is in Chesapeake Bay, where the quiet water and the mild temperature are favorable to the growth of oysters. Modern refrigerator cars make it possible to send oysters in good condition to all parts of the United States. One can now enjoy a delicious oyster stew in the Middle West as well as at the seashore.



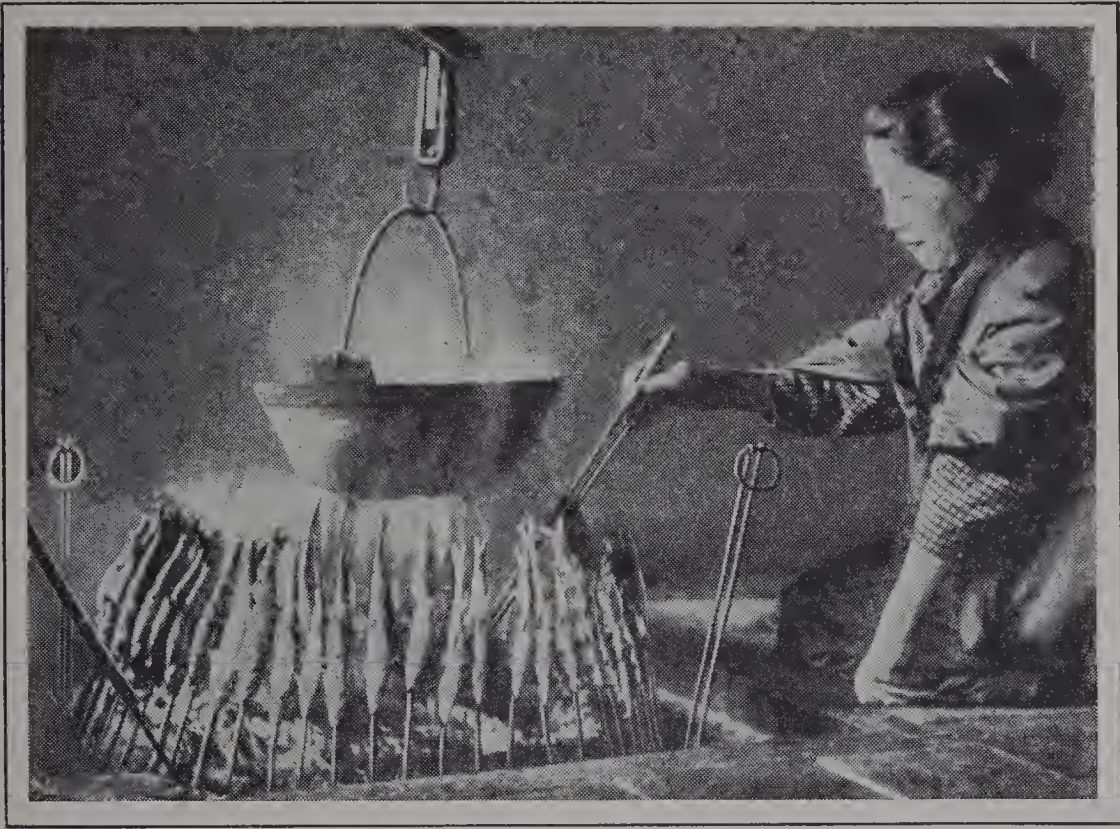


One of the most interesting of the shellfish industries is lobster-fishing. The American lobster is found off the Atlantic coast north of Delaware Bay. Both lobsters and crabs are caught in wooden traps called pots. These pots are made in such a way that the crabs or lobsters may crawl into them but not out of them. The pots are let down to the sea bottom and anchored by a rope which is fastened to a buoy. Every day the lobsterman goes out to pull up his pots, collect his lobsters, and rebait his traps. Lobsters are highly prized by a great many people, and they bring a good price in the market.

Fish must have been in some ways rather difficult for early man to catch. Probably he first found them in ponds that dried up in the summer or in holes along the seashore which imprisoned some of them as the tide went out. Finally he found various ways of catching them by means of traps, nets, spears, and hooks. This was an exciting sport, so much so that even today the average fisherman finds his great reward in the fishing rather than in the fish he catches.

For a great many people in the United States fishing is a business, an important industry. The early settlers on the Atlantic coast would have found it hard to get enough food for the long, cold winters if they had not been able to catch fish off the New England shores. In the Atlantic there was a plentiful supply of fish: cod, haddock, halibut, and mackerel. These were salted and smoked for winter use. Fishing today has developed into a great industry along the Atlantic,





*Drying fish in Japan*

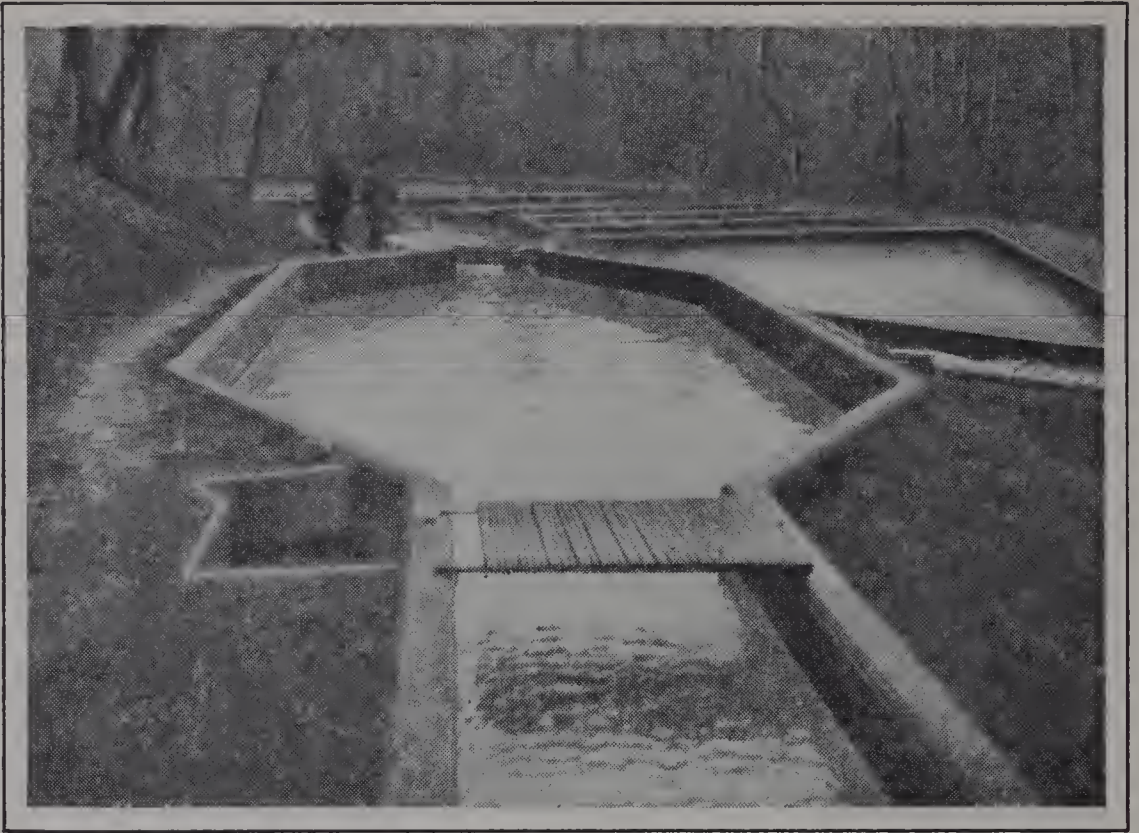
One of man's early ways to keep fish was by drying. How many kinds of dried fish can you buy in your market today?

Gulf, and Pacific coasts and also around our Great Lakes. On the Pacific Ocean a single net has been known to bring in as many as 100,000 salmon in one catch. Canned salmon is our chief fish export. It brings in an annual income of about \$10,000,000. Cod-fishing is one of the most important branches of the fishing industry. Cod is sold not only as fresh fish but also as salted fish all over the country. Cod livers are used for making cod-liver oil.

There are many other important things to tell you about this wonderful industry, but probably you are beginning to wonder about the value of these








*A fish hatchery*

Fish is such a valuable food and fishing is such good sport that the United States government has many fish hatcheries. From these hatcheries lakes, rivers, and streams are planted with tiny fish each year. What kinds of fresh fish are found in your markets? Which do you eat?

 different foods in the diet. I must now turn to that subject. I hope that you will look up further interesting facts about the meat, fish, and egg industries to report to the class.

Please notice that there is no other article of food which is so much like our own tissues as the flesh of animals. There is probably none from which greater amounts of protein can be so easily obtained, digested, and absorbed by our bodies. It is therefore one of the best building materials for the body, and it greatly aids in the repair of broken-down cells. Meats also contain


certain flavoring substances, which help the appetite and the digestion.

Although meat contains no carbohydrate, it is often rich in fat, which furnishes energy and heat. It contains some valuable mineral salts, such as iron and plenty of phosphorus, but it contains little calcium.


Ordinary meats contain only a small amount of vitamin B and practically none of A, C, and D. The organs, such as the liver, kidneys, and sweetbreads, are more nearly complete foods, however, since they have all the good qualities of ordinary meats and, in addition, contain vitamins A, B, and C. Vitamin D is found abundantly in the fresh livers of the cod, halibut, and salmon.

The active life of children makes it necessary for them to eat large quantities of protein. Meat, therefore, should be included in the diet of growing children.

When we speak of meat, we include several products of the animal kingdom, namely, meat, game, fish, and poultry. By *meat* we usually mean the flesh of cattle, pigs, and sheep. The word *game* is used for the flesh of wild animals. In food values poultry and game are practically the same as the flesh of cattle. There is no difference between white and red meats. Whether meat, game, and poultry can be easily digested or not depends on the age of the animal and the way in which it is cooked.

Meat is one of the few articles of diet which can by itself support life for an almost unlimited time. Stefansson, the north-pole explorer, and 



 his crew once lived on meat for eighteen months. They not only kept well, but they experienced no damage to the kidneys, which some experts thought might be injured by such a high-protein diet. This was only an experiment by Stefansson. A diet of meat alone is not suggested for anybody.

An egg is an undeveloped chick. If we say it this way, we can understand how valuable eggs are in the diet. All the egg needs before it can become a chick is heat. The egg, therefore, contains everything necessary to produce flesh and bone.

The egg contains some calcium. Besides calcium, the egg also contains phosphorus. The yolk is rich in iron. The white of the egg is rich in protein, but the yolk of the egg is made up largely of fat and is therefore the more nourishing part. This fat is similar to butter fat. It has vitamins A and D, but it is poor in vitamin B, and lacks C altogether. Since eggs contain no carbohydrates, they may be used at breakfast with foods like rice or other cereals.

The discovery within the last few years that fish oils contain vitamin D has emphasized the importance of fish in the diet. As you have already learned, fish contains more iodine than vegetables, fruits, or meats.

The protein of the fish is very much like the protein of meat. Fish differ in their fat content. Certain fish have more oil or fat in their flesh than others. Salmon, halibut, sardines, shad, butterfish, and mackerel are examples of fat fish. Cod, haddock, and flounder are

lean fish. The liver of cod, halibut, and salmon contains large amounts of vitamins A and D.



In closing, Edward Brooks reminded them that fish should occupy an important place in the diet. He said that fresh fish was always served at the Chew-Chew Inn on Friday. He urged them to remember to try it. He also asked them to tell what they needed with it to make a balanced ration.

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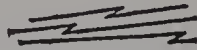
CORNELIA HOFF

Ralph Waldo Emerson once said that there is a best way of doing a thing, if it is no more than boiling an egg. Do you know how to boil eggs? I have just read an article about eggs and how they should be cooked. Here are some of the things I learned:

1. Eggs are rich in all growth substances except vitamin C.
2. The yolk is more important than the white.
3. The fat in an egg is easily digested.
4. The "boiled egg" should never be really boiled. The water should be boiling when the egg is put into it, but not afterwards. In this way the egg will be cooked evenly all through.
5. The color of the shell makes no difference in the food value of an egg. White eggs are as nutritious as brown eggs. Some markets, however, prefer one kind to the other.

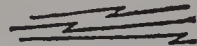
I have decided to collect for my notebook a dozen recipes in which eggs are the principal part.

*Nellie*



My uncle has just returned from a visit to New Brunswick. He brought with him a map which shows all the native animals and fish of New Brunswick, and also all the industries. It is issued by the Chamber of Commerce. My uncle said that such maps have been made for all parts of Canada and that these maps will be sent to anyone who writes for them. I shall write for some and bring them to class for discussion.

*Donald*



A girl read in her cookbook, "Separate two eggs." She put one at each end of the table. How should you do it?

*Marian*



## XXI

### *A Debate: Which is Better for Health, Candy or Fruit?*

IT WAS very quiet in the W. T. Room. Instead of a broadcast there was to be a debate on candy and fruit between Jack Rogers and Eleanor Holt. Jack Rogers was the champion of candy. Eleanor was the champion of fruit. On her desk was a big basket of fruit. There were oranges, dates, bananas, apples, grapes, and plums in it. Many bright eyes were turned in Eleanor's direction. Dick Barnes said, "That basket of fruit certainly makes my mouth water." Jack Rogers had a box of different kinds of candies. There were chocolates, chocolate bars, stick candy, and colored lollipops. This box of sweets had its admirers also.

"I hope Jack will give us some after school," said Polly Fox. "How I should like one of those lollipops! Of course Jack will win."

"I am not so sure about that," said Sylvia Russell. "You know Eleanor is a good talker."

"Listen," said David Smith. "It's about to begin."

Marian was in the front of the room, facing the children.

"We are to have a little change today from our regular program," she said. "We are to have a debate. The question is, Resolved, That candy is a better food than fruit. The audience is asked to pay strict attention to what is said, so that each child will be able to vote fairly. The speaker who presents the best arguments wins. Now we are ready to begin. May I present the first speaker, Jack Rogers?"



OR



Boys and girls, I think I shall not have to talk very long about candy to make you see that it is a real food.

All this year we have heard about energy. We know that we need a great deal of energy to live. It takes energy for me just to stand here and talk. The more energy we use, the more we need to eat of the kind of food that furnishes energy. Now, candy, being mostly sugar, is rich in calories, which provide us with energy to do things. Look at this little block of chocolate. It contains 100 calories. Think of it! It contains as many calories as this much larger orange, for an orange is mostly water. It contains so much energy in such small space that when mountain climbers start on a long, hard climb, they nearly always carry chocolate or some other kind of candy with them. Many of you have heard of the famous Marathon races. Do you know that in those races the athletes eat sweets? Sugar is "quick fuel." It has the added advantages of being easily carried and easily digested. Besides,

candy is something that nearly all children crave, or long for, and a craving may mean a real need. See, doesn't this box of candy look good? Don't you long for a sweet from it?

Fruits, however, contain little energy; they are not so easily carried; and they do not altogether satisfy our craving for sweets.

I ask you, who are the judges, to keep in mind the main point I have made: we need energy to live, and candy contains more energy than fruit.



Jack bowed, and the children clapped their hands.

"That was a fine speech that Jack made," said Rose O'Grady. "It looks as though he would win. What he says is true: candy does contain more calories than fruit. What can Eleanor Holt have to say?"

"She can say a good deal. There is a lot to be said for fruit," said Walter.

Again Marian was ready to speak.

"You have heard the argument for candy. Next we shall hear some of the reasons why fruit is so important. Permit me to present Eleanor Holt."



That was an excellent speech that Jack gave on candy. He made a pretty good case for candy. Everything he said was true. But there is much to be said about fruit.

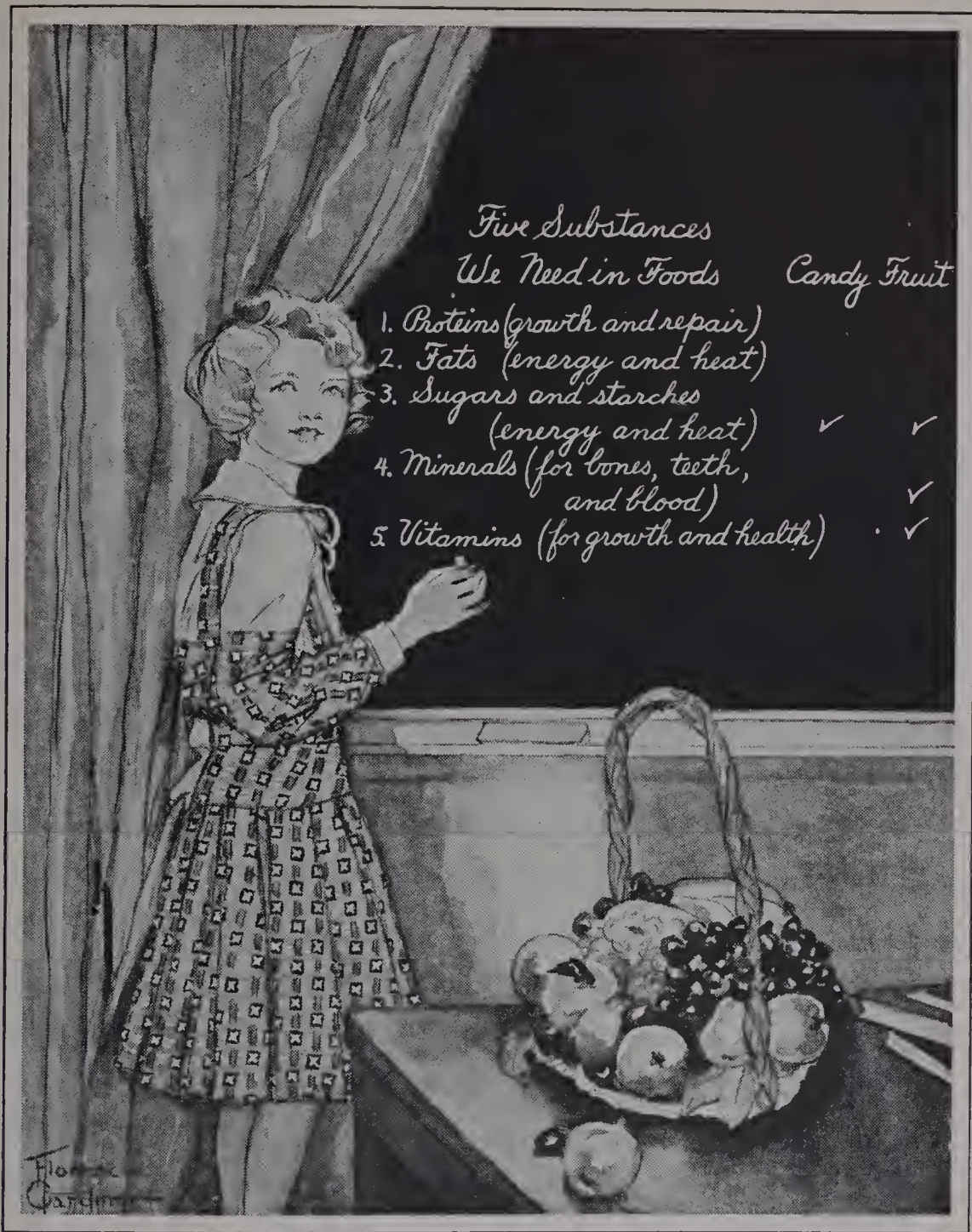


Let me begin by asking you to look at this table.  
[Eleanor drew aside a curtain before the blackboard.]

Five Substances We Need in Food	Candy	Fruit
1. Proteins (growth and repair) . . . . .	-----	-----
2. Fats (energy and heat) . . . . .	-----	-----
3. Sugars and starches (energy and heat) .	----- ✓	----- ✓
4. Minerals (for bones, teeth, and blood) .	-----	----- ✓
5. Vitamins (for growth and health) . . .	-----	----- ✓

This table gives us a chance to review some of the splendid lessons we have had on foods this year. It refreshes our memory about things that we must have in our food to be healthy. The diet necessary for health may be compared to a picture puzzle. If one part of the puzzle is lost or missing, the picture is incomplete. You have learned, for example, that if a person's diet is perfect except for the lack of vitamin C, which is found in fresh fruits and vegetables, the person is sure to get scurvy. Now let us see how many of the materials needed by the body are found in candy and how many in fruit.

Remember what Jack told you. He said that candy is largely sugar, and so furnishes energy. That we all admit; so let us put a check mark to the right of "sugars and starches," under "candy." Now remember that Jack told you only one important thing about candy — that it contains energy. I am going to show



### *Eleanor debates*

She says candy is a one-sided food and fruit a many-sided food. What does she mean? What does each contain? Should one-sided foods be eaten? When? Why is it better to eat fruit rather than candy between meals? Are chocolate raisins better than just chocolate or candy?

you not only that many fruits contain enough sugar to furnish much energy, but that fruit has other valuable substances as well.

Look at these dates and figs. They are as delicious as candy, and they are rich in sugar. They therefore contain much energy. These few dates contain 100 calories. This banana, too, is rich in sugar and energy. Any kind of fruit you might mention has sugar or starch. Let us put a check mark after "sugars and starches," under "fruit."

Protein, we have learned, is necessary for the growth and repair of the body. Since the chief business of children is to grow, you can see how necessary it is for us to have protein in the diet. Almost all fruits contain a little protein. These bananas contain some.

You know how much we need minerals in our food in order to have the right kind of blood and bones, and sound teeth. Let's think about this orange for a moment. It contains much water, as Jack says, but it also contains iron, which makes the blood red. Fruit contains calcium and phosphorus as well, — those substances which we know are so necessary for teeth and bones. Fruit has many other minerals that the body needs. Let us put a check mark after "minerals," under "fruit."

Fruit is noted for vitamins A, B, and C. An orange has about 100 calories, and it is wonderfully rich in vitamins, as we learned before. Let us put a check mark after "vitamins," under "fruit."

My father and I have just finished reading a thrilling



book about Count Luckner, which shows how important the vitamins in fruit are. Count Luckner was in command of a German sea raider during the World War. After sinking fourteen ships without taking a human life, he lost his own ship on a reef and set out with five of his companions in an open boat eighteen feet long. They sailed 2300 miles before they were finally taken prisoner.

Their diet was mostly hard-tack, a very hard kind of cracker composed almost entirely of starch. They had no fruits or vegetables. Their worst enemy now was scurvy. Their knees swelled so badly that they had to cut their trousers. As their knees knocked together or against the sides of the boat the men endured great suffering. Their teeth became loose, their gums snowy white, and their tongues swollen and hard. They grew so weak that they could hardly stand on their feet. At a time when they had nearly lost hope, they caught sight of a tiny speck on the horizon. It turned out to be the friendly green of a tropical island.

As they approached the shore, however, they saw hundreds of fierce-looking warriors. Cripples, they thought, would not fare well among such savage peoples; so they begged some fresh water and bananas and again set sail.

The sun shone down upon them. A brisk wind carried them along. They felt happy. After the first day they felt better. Even as early as the second day they felt well on the high road to health, and before long they were well again and bound for further adventure.

The vitamin C in the bananas had cured them of the scurvy. Does anybody imagine that candy would have done the same thing? The bananas, as you know, also furnished energy.

Somebody is going to say that some candy has fruit and milk in it. That is true; and if it does, then it may have some of the points I have put down for fruit, but most candy sold to school children does not have fruit in it.

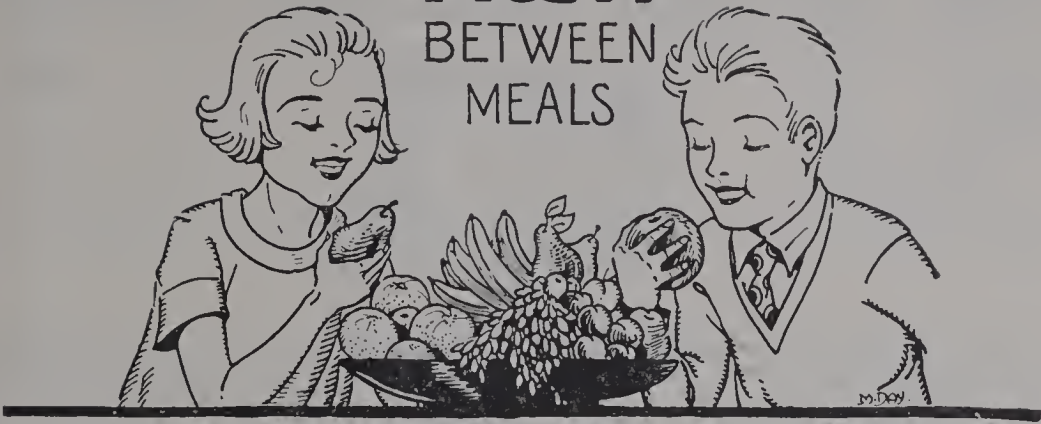
One of the chief objections to candy is that it is a one-sided food. This does not mean that it ought never to be eaten. Bread eaten alone is one-sided, because it contains mostly starch; but when eaten with butter and milk, it is all right. Potatoes are also a one-sided food. Good, pure candy, if eaten in small quantities for dessert or if eaten shortly after a meal, may be thought of as a worth-while food; but this is one thing that we should all remember: *candy is an appetite killer when eaten between meals*. The person who eats candy at recess or before meals is not hungry when he goes to the table. He will not eat such good foods as milk, vegetables, and fruits, which are many-sided foods.

I think it would be a fine thing to start a *No Candy between Meals Club*. I am sorry to see so many of us spending our pennies for candy at recess. Would it not be better for us to buy a little fruit? An orange or an apple will not kill the appetite for meals as candy does. Think about it.



OR



**FRUIT  
BETWEEN  
MEALS**

*We belong to the No Candy between Meals Club*

"You may prepare to vote," said Marian. "If you think that Eleanor won, write 'fruit' on your slip of paper; if you believe that Jack proved his point, write 'candy' on your slip."

"Philip and Ruth, will you please collect the slips and count them at the back of the room?"

In a few minutes Philip said: "We are ready to report. There are thirty votes in all. There are twenty-five for fruit and five for candy."

"May I say a word?" asked Jack.

"Certainly," said Marian.

"I think the vote should stand thirty for fruit, because there isn't any doubt that fruit is better for us than candy. I want to be one of the first members of the new club that Eleanor has suggested. It would be splendid if everybody in our room joined the 'No Candy between Meals Club.' Perhaps the idea of such a club might spread to other rooms."

"Hurrah for Jack!" cried somebody. "He is a jolly good loser."



# THE HEALTH BULLETIN BOARD



CORNELIA HOFF

I am having a banana, an orange, or half a grapefruit for breakfast every morning. When I am hungry between meals, I am buying fruit instead of candy. I find that I have a much sharper appetite for my dinner if I eat an orange instead of candy. Let us get together and organize a *No Candy between Meals Club*. Will those who wish to join such a club please put their names below after mine?

*Robert*

Wasn't the debate exciting? I thought both Jack and Eleanor did well. Were you surprised at the result? Just the same, I like candy, and I should be glad to have some recipes for pure candy which we can have for dessert at dinner. I will put them into my notebook. Can you give me one or two?

*Ann*

My mother makes a delicious dessert called chocolate raisins. You ought to see the smiles on our faces when mother surprises us at dinner by passing a basket of chocolate raisins. Mother taught me how to make them. This is the way :

Melt one-half pound of sweet chocolate. Into this stir one and one-half pounds of seedless raisins which have been washed, dried, and picked over. Spread on heavy paper to cool. Break into clusters. Serve for dessert in place of candy.

*Barbara*

## XXII

### *Jack and Jill*

THE next day after the debate the boys and girls in the Work Together Room had a pleasant surprise. If you had been there, you would have seen them gathered around Miss Leader's desk.

"Aren't they cute? How old are they? What do they eat? Where did you get them? Have they names? Are you going to keep them in school all day?"

These were a few of the questions that the children were asking David Hill, and David was trying to answer them all. On Miss Leader's desk was a cage in which there were two baby rats. Both were white, but one had a black nose and three tiny black spots on his back. His name was Jack. The other rat was pure white, and its name was Jill.

"What are you going to do with them, Dave?" asked Polly.

"Well," said David, "I thought it would be fun to prove for ourselves whether some of these things that we have heard about health are true or not. I asked Miss Leader if I might ask my father to buy me two white rats to bring to school to experiment on just as the great scientists have done. She said I might.

These are the rats we bought. It was Dad who named them Jack and Jill."

"Won't that be fun!" cried all the children. "Can we begin today?"

"Yes, we can start right away," said Miss Leader. "What shall we do first?"

"Let's weigh them," said David. "Here are some special scales I brought from home. They give the weight in grams. Let's weigh Jack first."

The children found that Jack weighed 100 grams. When they put Jill on the scales, they found that she weighed 70 grams.

"Jack weighs more than Jill, but they are both healthy," said Polly. "See what bright eyes they have, and how glossy their coats are."

"What shall we feed them?" asked Miss Leader. "Have you planned their diet, David?"

"Yes, I have thought it all out, Miss Leader. Suppose we give both of them all the corn meal they can eat, salted a little to make it taste better. In addition, we can feed Jack coffee and sugar, and Jill milk and a bit of green vegetable. Then we can watch what happens. Every week we must weigh them and record their weights on a graph."

"That's a fine idea, David. Let's do it!" exclaimed Marian. "What do you think will happen?"

"If what we have learned is true, then Jack will not gain in weight so much as Jill. Perhaps he will not gain at all. Jill will steadily gain because she will have a balanced diet."





*Jack and Jill get their first meal*

Both these baby rats were in a clean, sunny cage and had plenty of water. The children were very fond of them and treated them kindly. They were fed differently. What was each rat fed? Did it make any difference in their gain in weight?

"I think we ought to be careful to see that Jack and Jill are treated alike in every way except in the food they are given. Each must have a clean cage, plenty of water, and sunlight. Let's feed them their first meal now."

Day after day the boys and girls watched Jack and Jill. During the first week both rats gained in weight, but Jack gained less than Jill. Jack probably gained a little the first week because of the good food eaten just the week before. Several weeks went by. Jill gained steadily, while Jack made no further gain.

"Poor Jack," said Marian. "Jill is beating him. She weighs more now than Jack."

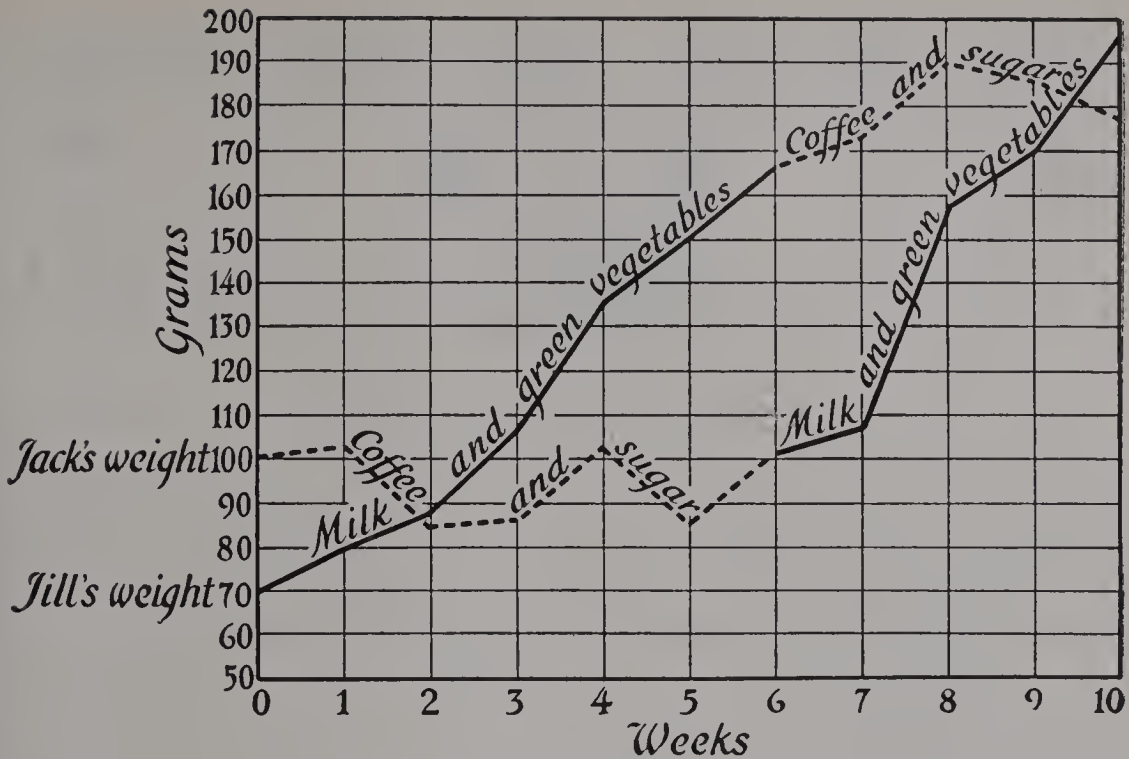
"See how healthy Jill is," remarked Sally. "Her coat is smooth and glossy, and she loves to play. How bright her eyes are! She sleeps well, and she doesn't seem to be a bit nervous."

"Jack doesn't look well at all," remarked Alice. "He has grown very little. His coat is rough, dry, and ugly. At first he was very nervous, but now he seems to be lifeless. When we gave both of them nutshells to gnaw the other day, Jack broke two of his teeth, but Jill's teeth were too strong to break. It's just what we expected. Coffee and sugar have nothing in them to make for growth. Milk is, of course, almost a perfect food."

"Let's feed Jack milk and greens and see what will happen," said William. "Poor Jack ought to have a chance now, and let us feed Jill coffee and sugar."

So Jack was fed milk and green vegetables, beginning with the seventh week. If you look at the graph on the following page, you will see how he gained in





*Jack and Jill run a race*

Did they both start about even? Why was Jack the first one to lose? When did Jack begin to gain steadily? Why? Why did Jill lose the race?

weight until at the end of the tenth week he weighed a little more than Jill. Not only did he gain in weight, but he began to sleep better. His coat became smooth, and once more he began to play. All this happened, as you can see, because Jack drank milk and ate green vegetables while Jill began to drink coffee and eat sugar at the end of the sixth week.

"What did you learn, Carroll, from this feeding of the rats?" asked Miss Leader.

"I learned once more how necessary it is to eat the right kind of food. I am going to eat less candy than I have been eating, and save it always until after meals. If I eat candy at all, I am going to eat fruit and vegetable salads and drink milk first."

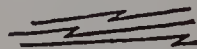


# THE HEALTH BULLETIN BOARD



CORNELIA HOFF

Last week I went out into the country to visit my uncle, who keeps a poultry farm. It was very interesting. He keeps several thousand White Plymouth Rocks. Some of his hens have won a state prize for laying eggs. When I asked Uncle Joe what had made him successful, what do you suppose he said? Simply this: "I keep my poultry healthy." He showed me how the henhouses are built so as to give the hens plenty of sunshine and fresh air. In the summer the hens get exercise in outdoor yards. In the winter they scratch in the straw in their open-front houses to get some of their food. They are well supplied with fresh water and good food. I never realized before that even hens must have a healthful diet, but Uncle seemed to understand it. He began to talk about minerals, such as calcium and phosphorus, and also proteins and vitamins. I found that the hens always had some kind of fresh vegetable, such as carrots or cabbage, to eat. I have written in my notebook: "To be a successful hen you need to have the right kind of food." Isn't that true also of dogs, cats, cows, and even boys and girls?



*Peter*

I have a puppy named Andy Koo. He is growing up into a healthy and beautiful dog. I should like to broadcast a talk on "How We Are Bringing Up Andy Koo." Should you like to hear it?

*Vittoria*

## XXIII

### *Are Alcohol, Tobacco, and Drugs Good Friends?*

THE boys and girls of the W. T. Room were sitting in a circle during the discussion period, having a talk about how to be healthy. It was great fun to be in this little circle, because everybody had a chance to ask questions and to tell about his experiences. The children had been talking about such good friends as fresh air, sleep, and nutritious food. Everybody agreed that they were friends worth having.

Then Tom spoke up and said: "A man living in our neighborhood says that alcohol is a good friend, that it will do all sorts of wonderful things for those who drink it. He says that alcohol is a food, that it will make you stronger for work and play, that it will keep you warm in cold weather, protect you from disease, and make you happy. I wonder whether that is so. If it is so, then perhaps one ought to drink alcohol instead of milk, for all would like to be happy as well as healthy. Would alcohol be a friend worth having?"

"I have been thinking the same thing about tobacco," said Sally. "I have heard some people say that tobacco is good for your nerves. There must be some good in it since so many people smoke. Would

it be all right for one to smoke? Are cigarettes good for boys and girls? I should like to know."

"Father was reading in the paper last night about some men who were smuggling in opium at an American port," said Ralph. "It seems that although there is a law against bringing opium into the country, many people try to bring it in just the same. They try to hide it on their persons or in their clothes and luggage. When they get it to shore, they peddle it secretly to those who have the opium habit. Father says that people who take such a drug finally cannot stop taking it. They are no longer masters of themselves. The drug has weakened their will power. It doesn't seem possible that such a drug can be a good friend."

"I know who could help us to answer some of these questions," said Miss Leader.

"Is it Dr. Strong?" asked Emma.

"You guessed right," said Miss Leader. "And I think Dr. Strong is in the building this morning. Shall we ask him to come in?"

"Yes! Yes!" cried all the children.

In a few minutes Dr. Strong, the school doctor, appeared at the door. A friendly, helpful man, he was very popular with the children.

"Good morning, children," he said. "What can I do for you?"

"The children have some questions they would like to have you answer," said Miss Leader. "The first one is about alcohol. Will you state the question, Marian?"



"We have been wondering whether or not alcohol is a good friend. A number of questions have come up about alcohol. The first one is 'Is alcohol a food?' What do you think about that, Dr. Strong?"

Dr. Strong waited a moment before answering, as if he were thinking deeply. Then he said: "There may be a difference of opinion about that, depending on what we call a food. The only claim that alcohol has as a food is based on the fact that the body may use small quantities of it for energy. Alcohol does not need to be digested. It is absorbed at once into the blood stream. This is one of the reasons why doctors used a certain amount of alcohol in days gone by. That practice has now almost disappeared. Doctors have found that plain sugar and water will do almost as well.

"Most doctors and scholars would say that alcohol is not a true food, like milk, for example. You have already learned, I think, that milk builds up and repairs the body. This is not true of alcohol. It circulates in the blood until it is burned up. If more food is eaten than is needed immediately by the body, it may be stored as fat or muscle. But if more alcohol is taken than the body can use, the body tries to throw it off through the breath or the kidneys. If alcohol is a food, there is no denying that it is a dangerous one."

"One of our neighbors says that alcoholic liquors like beer and wine are appetizers, that they lead us to desire more food and so help our appetites. Is this a good reason for drinking alcoholic beverages?" asked Tom.

"No, positively no," said Dr. Strong. "When a person loses his appetite, it usually means that he does not have the right health habits. People who get plenty of exercise in the open air and enough sleep and rest do not have to be coaxed into wanting good food and enjoying it. Among the things that kill a good appetite are too much rich food at meals, too many sweets between meals, and a lack of exercise. Many an appetite has been lost through candy and pastry eaten after school in the afternoon.

"It is true that in days gone by," Dr. Strong went on, "doctors used to give their patients alcoholic drinks or drugs called tonics to encourage the appetite; but that practice has gradually died out. In the rare instances when alcoholic liquors or tonics may be used as appetizers, they must be taken only on the advice of the family doctor.

"The chief reason why alcohol is dangerous is because it contains a poison which numbs the brain. As you know, the brain is the seat of the mind. It is the source of the control of our thoughts and of our muscles. If you have ever seen the sad sight of a drunken man staggering along the street, you realized that he had lost control of his muscles. Sometimes a drunken man finds it difficult even to speak, because his tongue is so thick. It is really paralyzed by liquor. The finest mind loses some of its power to think when it is under the influence of alcohol. This is one reason why railroad engineers are not allowed to use alcohol. They must always be clear-headed and alert."

"Suppose a person drank only a little alcohol. Would that make any difference to his work?" inquired Susan.

"Yes," replied Dr. Strong. "It has been shown that when a workman, such as a typesetter, drinks a small amount of alcohol, he is less capable of doing his work than he usually is. He cannot do so much, and he is likely to make more mistakes in what he does do. People who take part in games or who hike are not able to do so well when they drink alcohol as when they don't, though, strange to say, the drinker usually thinks that after drinking he can walk faster or do more work than ever. For this reason alcoholic drink is sometimes called the 'great deceiver.'"

"Will alcoholic drinks really keep you warm? If so, wouldn't it be a good thing to drink them in cold weather?" asked Alfred.

"There again alcohol is a great deceiver," said Dr. Strong. "Alcohol causes a greater amount of blood to flow to the surface of the body. In the skin there are little sense organs that tell us about the temperature of our skin. When the blood rushes to the skin, the drinker feels that he is warmer. What actually happens is this: as the blood flows into the skin, the body loses its heat very rapidly, so that the body itself is left colder than it was before. This would not happen after milk was taken into the body, for milk contains much more energy than any kind of alcoholic drink. Such great polar explorers as Peary, Nansen, and Scott would not allow their men to use alcohol on their trips."



"Would alcohol help us in our fight against disease?" asked Fred.

"Every doctor knows that the man who has the habit of drinking has, ordinarily, a poorer chance than the man who doesn't drink," said Dr. Strong. "He is much more likely to lose his life in an illness like pneumonia, for instance. Some people think that alcohol is good for colds because it draws the blood to the surface of the body and encourages the person to sweat when he goes to bed and covers himself up with warm blankets. There may be some truth in this, but the same good could be accomplished by almost any hot drink, as, for example, hot lemonade. It is safe to say that the ancient proverb 'It takes whisky to kill a cold' is one of our superstitions."

"Is it true that drinking alcohol will make one happy?" asked Beatrice.

"That is a good question, Beatrice," smiled the doctor, "for we all want to be happy. But what is it that makes people happy, not just for a minute, but for most of the time? Can you tell me?"

"I am not certain that I know, Doctor, but I think most of us are happy when we get the things we need, such as food, clothes, a comfortable home, and friends. When we succeed, we are happy; at least I am."

"Well, I guess nearly everybody is like you, Beatrice. Drinking alcoholic liquor wouldn't bring success. It sometimes does make people seem to be happy for a time, but here again it is the 'great deceiver.' The man who drinks glass after glass of liquor may forget

his troubles for a time; but when he recovers from the effects of the alcohol, he is still as badly off as ever. A glass of milk would not deceive you, as alcohol does, and it would leave your body in a better condition."

"I heard one man say that drinking alcohol made him less tired. Is that so, Dr. Strong?" inquired Marjorie.

"It may seem to make him less tired," he said, "but it is only a seeming. We might think of alcohol as a kind of whip. It brings about immediate action. But the tired man who drinks it is soon, like the tired horse that has been whipped, more tired and worn out than he would have been if he had used no alcohol. Foods give lasting benefits.

"Here are a few things worth remembering about alcohol:

"1. Alcohol contains a poison which affects the control of both mind and muscles. It is a drug and not really a food.

"2. A person in good health does not need an artificial stimulant for the appetite. Exercise in the open air and appetizing food are natural stimulants.

"3. Alcohol and other drugs only *deaden* the tired feeling. They do not really take it away. You are *more* tired after taking them than you were before.

"4. Both the use of alcohol and the use of tobacco lead to habits that are hard to break."

"But what about the man who just takes a little now and then? May he not get along about as well as anybody and live to a good old age?" asked Fred.

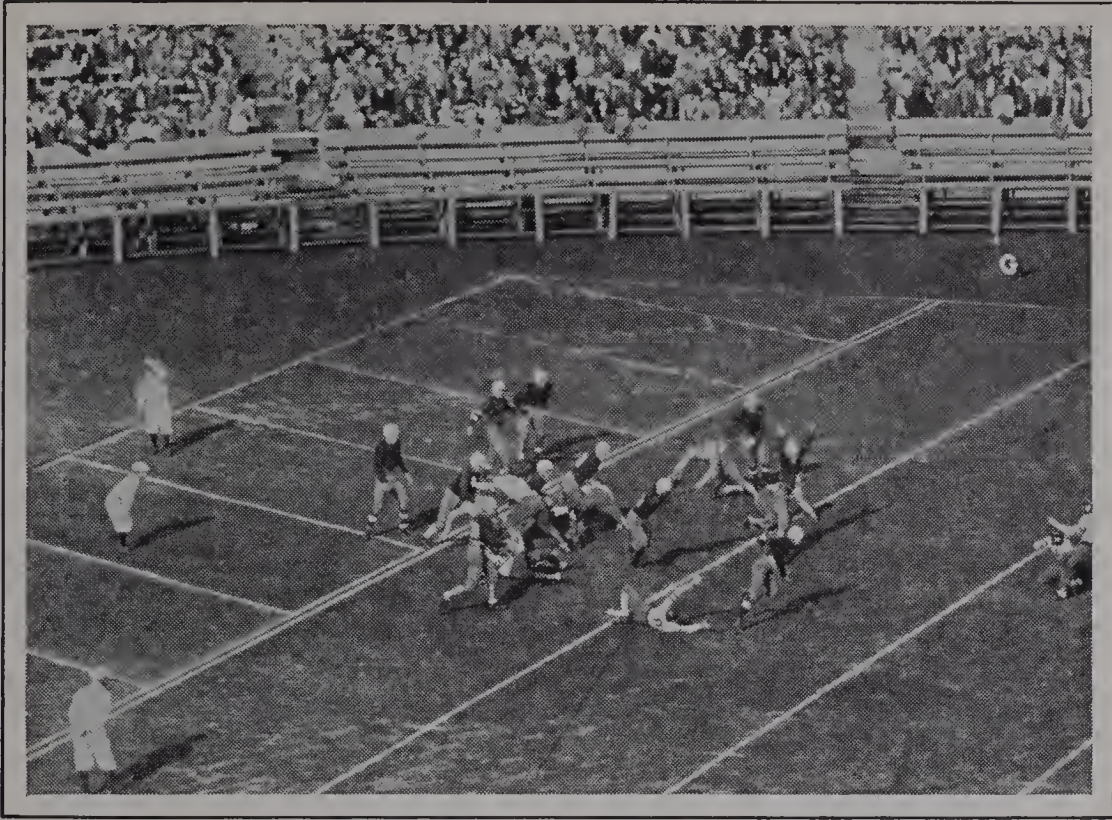
"Well, he may," replied the doctor, "if he eats the right kind of food, gets fresh air and exercise, has plenty of rest, and does the other things that make for healthy living. But the body does not need alcohol. Alcohol is not a true food. Besides, there is always the danger that a person who begins to use alcoholic liquors may not be able to stop. A man doesn't know just where he is going to end when he starts in. He may drink a little now and then, or the habit may fasten itself upon him. And once the habit is fastened on him, it is very hard to overcome. The safest way is never to begin. Everybody agrees that drinking to excess tends to wreck both body and mind. Alcohol has brought much distress into the world."

"Thank you, Dr. Strong, for your good advice," said Miss Leader. "I am certain nobody here thinks that alcohol is the kind of friend we ought to have. We also want to ask you some questions about tobacco. Is there any harm in our smoking tobacco?"

"I should never think of tobacco as being a good friend for boys and girls. Some of the things we have said about alcohol are also true of tobacco. Tobacco is not a food; the body does not need it. It contains a poison called nicotine. The hot smoke tends to irritate the throat and nose. Then again, it is habit-forming. Few who start to use tobacco ever stop; and if they try to give up the habit, they have to fight a big battle to overcome it."

"Does it help boys and girls to be successful in their studies and in athletics?" asked Miss Leader. "Our





*Good health habits count in a game*

Every athletic coach insists that the members of the team take excellent care of their health and avoid the use of alcohol while training. What may the player do to help him play at his best? Is the athlete who drinks or smokes giving himself a fair chance?

coach in football and our high-school principal think that tobacco does not help."

"They are quite right," said Dr. Strong. "I believe that all trainers in football, baseball, track, and other sports caution their men against using tobacco. It interferes with their breathing and with their heart action. There are nearly always more good students among the nonsmokers than among those who do smoke. There are always more failures among the smokers."

"May I ask about those who smoke in moderation?" asked Marjorie. "Is there any harm in smoking that

way? I know people who have used tobacco all their lives and yet seem to be strong and healthy."

"You are quite right, Marjorie," said Dr. Strong. "They may in general take such good care of themselves by getting sleep and nourishing food that they will not suffer noticeably from the use of tobacco. But no doctor doubts the bad result from too much smoking. It is bad for the heart and the nerves. Even a single cigar will lessen a man's skill in firing at a target. Like alcohol, tobacco is a habit-forming drug. As soon as a habit of that kind takes possession of a man, it rules him. The smoking habit says to its victim, 'Now is the time to smoke,' and the slave obeys. It says, 'Now is the time to reach into your pocket and get out the money for a package of cigarettes,' and again the slave obeys. Such a habit takes away one's independence. This is not true of the drinking of milk, orange juice, or lemonade."

"It is expensive to smoke," added Mary. "My big brother smokes, and he spends fifteen cents a day for cigarettes. Think how much that amounts to in a month or a year. I am going to save my money for things more worth while. I am beginning to put my money in the bank. Some day I shall travel to Europe."

"Good for you, Mary! That is very wise. May you have a wonderful time visiting the Old World!"

"But there are other drug habits that are even worse than the alcohol and tobacco habits, aren't there?" asked Alice. "I mean habits like taking opium and other drugs."



"Yes," answered the doctor. "Some of those drugs are used by physicians because they dull pain. Many a person has been able to go to sleep and forget his pain when very ill because the doctor gave him a drug of some kind. But such drugs should be taken only on the advice of the doctor, because they are also habit-forming. It is never safe to take pills, powders, or medicines from people who are strangers. Some drugs are among the worst enemies of man. It is a dangerous thing to buy patent medicines and try to doctor yourself. Trust your family doctor, who has studied about health many years and is your friend.

"My advice to you is never to form any kind of drug habit; but if you are going to use tobacco or liquor in spite of what I have told you, wait at least until you are men and women before you begin. Instead of forming drug habits, form the health habits that you have talked about so often. They are a sure guide to happiness and success."

## THE HEALTH BULLETIN BOARD



CORNELIA HOFF

Which is the better friend, milk or alcohol? Will you take a dare? Will you debate this question with me before the class? I shall take the side of milk.

*Ralph*



It is my ambition to go to college and pitch on the baseball team, as my father did. Alcohol and tobacco will not help me make my ambition come true. I prefer to drink milk and eat wholesome food. They are good friends. I don't think anybody in our class is so silly as to believe otherwise.

*Paul*

Here is an arithmetic example: Mary's brother spends 15 cents a day for cigarettes. Mary says that she is going to save her money for travel. If she saves 15 cents a day, how much will she save in a year? Where can she plan to go with the money she saves?

*Lenore*

My list of new words is growing. What progress are you making?

opium

superstition

stimulant

nicotine

*Cathleen*

Among the best friends a boy or girl can have are good health habits. Drinking milk is one of the best. What is your list of good friends? Why shouldn't you put using alcohol and tobacco in the list?

*Roberto*

Let each of us write a five-minute talk on "Why Cultivating Good Health Habits is Better than Using Alcohol and Tobacco." Miss Leader might select two or three of the best ones to be broadcast.

*Pietro*

## XXIV

### *Are Coffee, Tea, Salt, and Pepper Good Friends?*

THAT discussion we had about alcohol was fine," said Mary. "I am glad we are going to continue to talk over some things this morning. I wish I knew why it is all right for grown-up people, like Uncle Sam, Aunt Jenny, father, and mother, to do things that they say we ought not to do.

"Mother says that we must go to bed early, but she and father stay up until quite late at night. Yes, and they get up earlier in the morning. If sleeping long hours is so good for us, why isn't it just as good for them? Then there is the question of coffee and tea. We are told that children should drink nothing but water and milk, but all the grown people that I know drink tea or coffee. If coffee and tea are so bad for us, why are they all right for them? Why shouldn't older people drink milk, like us?"

"Those are good questions," said Miss Leader. "Who has some answers?"

"I think I know one answer, Miss Leader," said Tom. "Children need more rest than grown people because children are still growing. And they need to have nutritious foods for the same reason. Don't you

remember that our doctor said it was the business of boys and girls to grow? If it's our business to grow, we must do all the things that are best for growth. Our mothers and fathers have stopped growing. It isn't any longer their business to grow ; so it doesn't matter so much if they have less rest and eat foods that don't build."

"But don't coffee and tea have as much food value as milk?" asked Dorothy.

"Why, Dorothy, have you forgotten what we learned about milk?" asked Marian. "Don't you remember that it is the most nearly perfect food in the world, and that it helps us, more than any other one food, to grow?"

"Yes, I do remember that," replied Dorothy, "but most people put cream into their coffee or tea."

"Yes, that's right. But, Miss Leader, aren't the milk or cream and the sugar used in coffee and tea about all the real food they contain?"

"Yes, Dorothy. And the amount of milk or cream used is very small ; and the sugar, since it has no protein in it, contains very little growing material. The coffee and tea themselves not only have no value as foods, but they contain a small amount of drugs that do not help to make anybody strong and healthy. Usually when children drink tea or coffee, they do not drink milk, and so they do not get as much food as they need. Drinking tea or coffee may not be harmful to those who are grown up, but children do well to drink milk instead."





*Owls do not sleep at night, so coffee will not keep them awake*

"Aren't the drugs in tea and coffee harmful to grown-ups?" asked Paul, turning to Miss Leader.

"I think doctors agree that they are harmful to those who drink too much, but the grown person who drinks a cup or two a day is not usually harmed. It would probably be better for all grown-ups if they drank less coffee and tea and more milk. Anyway, I never knew any doctor who believed it was a good thing for children to drink tea or coffee."

"I should like to ask a question about salt," said John. "Is it true that we should be careful not to eat too much salt? I don't understand that, for animals and people seem to need it."

"Yesterday I read that salt is needed for digestion," said Wallace. "Animals crave it so much that they will go long distances to get it. There are places called 'salt licks,' where animals, like deer, find salt in the ground. Doesn't our longing for salt probably mean that we need it?"

"Wallace is right," said Miss Leader. "We need

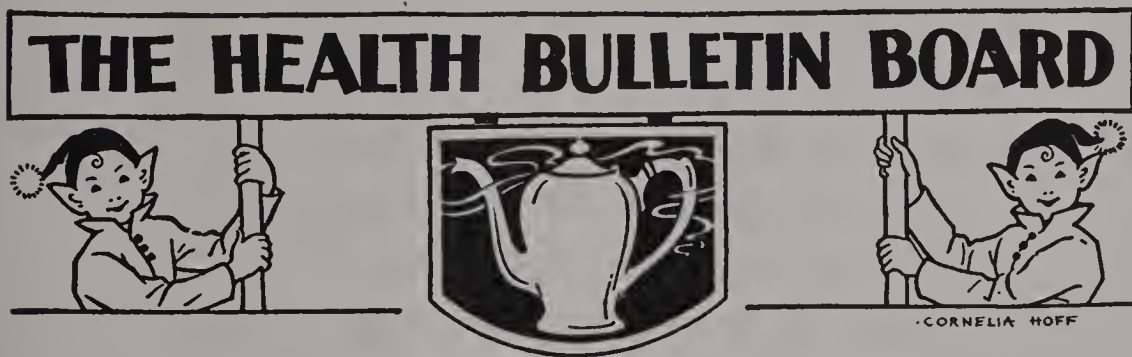
salt to flavor our food, to make it more pleasant to the taste. How flat meat, vegetables, and cereals would taste without salt! The trouble is that so many people eat too much salt. Then it irritates the delicate lining of the stomach and the intestines.

"Pepper is also irritating ; and as it has no food value, we are better off without it. Let us think for a moment how irritating pepper really is. Did you ever get any of it in your nose? What happened? The delicate membrane became irritated, and you sneezed. When you take pepper in your food, the membrane of your stomach becomes irritated in the same way. Repeated irritation results in harm to the stomach, digestion fails, and appetite is lost. The more such substances are used, the more they are craved, and soon the use of them becomes a habit. Remember the lesson we learned about not becoming slaves to certain habits.

"It is better for children not to eat highly seasoned foods. They are less nutritious than plain foods, and children who eat them find the plainer, good foods that they need for growth less pleasing than they should. Some of you will say that grown-ups eat olives, mustard, pickles, and other highly seasoned foods. If these foods are good for them, why shouldn't they be all right for us? That is a good question. The habit of eating highly seasoned food is bad for both children and grown-ups. Some people begin when they are young to eat such things because they have no one to tell them that condiments, which is the name by which such substances are known, are unnecessary to health

and, in fact, harmful. As they grow older, the habit continues until they reach the point where they cannot get along without condiments. Their natural appetites have been deadened by these artificial stimulants. Of course you and I will never have to resort to anything that is artificial. We will always depend on fresh air, exercise, and wholesome, pure food to sharpen our appetites."

"It's the story of habit again, isn't it, Miss Leader?" said Polly. "If we form the habit of eating highly spiced and highly flavored foods, we shall not care about food prepared in any other way; but if we get the habit of eating the best foods slightly seasoned with salt, pepper, and other flavoring, we can enjoy them just as much. Plain, wholesome foods are best."



Here are some interesting superstitions about salt. I found them in a book.

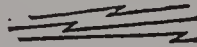
#### WHY SPILLING SALT IS THOUGHT TO BE UNLUCKY

Salt was an emblem of purity to the ancients. They placed it on the heads of animals which they sacrificed to their gods. To spill salt in the act of sacrifice was a sign that the sacrifice was not pleasing to the gods. From this grew the superstition that spilling salt is unlucky.

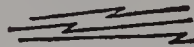


## THROWING SALT OVER YOUR SHOULDER

The ancients believed that their good spirit stood constantly at their right side and their evil spirit at their left. Because they believed that spilling salt was unlucky, whenever they spilled any they immediately flung some over their left shoulder to blind the bad spirit so that he couldn't see to do something unpleasant to them.

*Walter*

Do you remember the cause of the discovery of the New World? Tell the difference between the preparation of foods then and now.

*Jean*

Were these words new to you too?

**condiments****artificial***Terry*

## XXV

### *Can You Order an "A" Lunch?*

IT WAS the day for assembly at the Abraham Lincoln School. The school orchestra played an air from Mendelssohn. The pupils saluted the flag. Several announcements were made, and Walter Sylvester played a cello solo. Then the principal, Miss Wise herself, addressed the school. It was the great event of the day.

"Boys and girls of the Abraham Lincoln School," began Miss Wise, "I have a message for you today that I believe you will find very interesting. If I were to give the message a name, or title, I might call it 'Your Opportunity to Play the Game of Health.'

"We are all justly proud of what we have done for the health of this school. At the beginning of the year we had a cafeteria which was an ugly, disagreeable place in which to eat our luncheons. Some of us so disliked it that we never went there to buy food or to eat the lunches which we brought from home. Now all that has been changed. The lunch room is so neat, clean, and sunny, and the food is so good that we look forward to the noon hour, when we can go there to eat and chat with our friends.

"There is just one thing that we haven't all done.

We haven't chosen our luncheons wisely. For example, we have all learned in our classes about the value of milk and leafy vegetables; and yet Miss Jones, who has charge of the cafeteria and who has kept a very accurate record of everything that has been ordered during the last week, tells me that only about two in four of us ordered milk at luncheon last week. Only about one in six ordered lettuce, spinach, or some other leafy vegetable. We have all been interested in learning about milk, but we do not go to school simply to learn facts. Just knowing facts does not make us healthy. We need to use them. There is an old saying that 'knowledge is power.' This is only partly true. Knowledge tells us what things to do and how to do them. Then we ourselves must do the rest. Gasoline too is power, but only when it is set on fire by a spark and given a chance to work.

"Perhaps somebody here can give me one good reason why we haven't done some of the things that we know we ought to do."

Several hands were raised.

"James, will you tell me?" asked Miss Wise.

"Yes, Miss Wise," replied James. "I think it is because we have old habits that are hard to break."

"Quite right, James. We change old habits only when we have a strong desire to change them and when we really practice new ones. The teachers of this school and I have decided upon a plan which ought to make it easier for us all to form the habit of choosing the right kind of luncheon. Next Monday, one week from to-



day, Miss White, the cashier in Chew-Chew Inn, will notice what you have ordered when she looks over your tray. If your luncheon contains all the substances necessary for a perfectly balanced meal,—protein, sugar, fats, vitamins, mineral salts, and water,—you will get a card like this.” Miss Wise held up a white card. “On one side it says, ‘You have an “A” lunch’; and on the other side it tells you why. The game will be to get as many of these cards as you can. I think it will be fun to see which of the rooms will get the most ‘A’ cards. Since the game does not start in earnest until one week from today, you will all have a chance to review with your teachers some of the things that make up an ‘A’ luncheon.

YOU HAVE AN

A

LUNCH

WHY? (See other side)

## BECAUSE YOU HAVE

**Milk** —  $\frac{1}{2}$  pint, or two foods containing, milk, as ice cream, milk soup, creamed vegetable, or cocoa.

**Vegetable** — a full serving in addition to potato.

**Other Substantial Food** — such as meat or fish, bread and butter.

**Dessert** — fruit and a cookie.

**A Warm Food** — at least during cold months.

*Face of an "A" lunch card*

*Reverse of an "A" lunch card*

“For the first few days that we try out this plan,” said Miss Wise, “those children who are not successful

in choosing 'A' lunches will have slips such as these dropped on their trays," and she held up some yellow pieces of paper, from which she read:

YOU HAVE NOT AN "A" LUNCH

*To make an "A" lunch, you need*  
 $\frac{1}{2}$  pint of milk or two foods containing milk

*To make an "A" lunch, you need*  
A full serving of vegetable (besides potato) and fruit

*To make an "A" lunch, you need*  
Another nutritious food, such as bread and butter,  
meat, or fish

"Everything will be done to help you learn to select the best kinds of foods."

"That's a great plan that Miss Wise has, isn't it?" said Marian to Miss Leader later in the classroom.

"Yes," replied Miss Leader, "and I think we shall all enjoy trying it out."

"We ought to do at least as well as any other room," added Charles, "because we have spent so much time studying foods this year. All we need to do is to work together."

"That's a fine spirit," said Miss Leader.

That very afternoon the boys and girls in Miss Leader's room started in to work. First of all, they read and studied with care a sample of one of the "A" cards. Then Katherine brought in a very valuable guide for planning meals and hung it on the

bulletin board. Miss Leader said that in addition to checking up a luncheon menu with the "A" lunch card, it would be worth while to check it up also with the guide for meal-planning. *See pages 272 and 273.*

"Let us look at the menu for tomorrow. It is already out for the children to study," said Miss Leader. "Let each of us try to make out an ideal luncheon order and then test it by each list. Who will be the first?"

"I have one," said Alice. "Doesn't this sound good?"

Lamb Stew  
Lettuce and Tomato Sandwich  
Sliced Bananas  
Cookies  
Ice Cream"

"That sounds all right," said Miss Leader. "Will you please check it up with your guide? First, have you any energy-giving foods?"

"Yes, in the bread and butter of the sandwich, the sliced bananas, the cookies, and the ice cream. Then for body-building, the lean meat in the stew and the ice cream are rich in protein. Ice cream contains calcium and phosphorus; the lean meat contains iron. There are vitamins A, B, C, and roughage in the lettuce. The ice cream has vitamins A and B, and the vitamin-D bread has vitamin D. Yes, it checks up all right, Miss Leader. It also checks up with the directions on the back of the 'A' lunch card."

"That's fine," said Miss Leader.

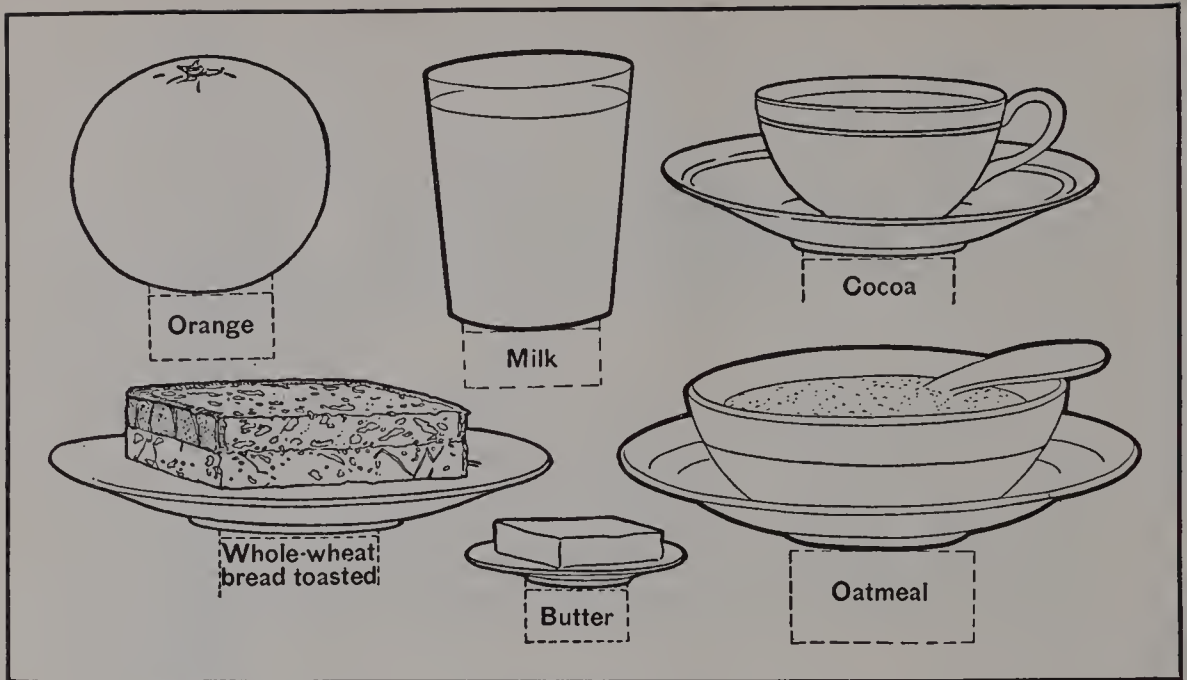


A SIMPLE GUIDE FOR MEAL-PLANNING: HAVE SOME FOOD FROM EACH GROUP  
IN EACH DAY'S MEALS

Energy-Giving Foods			Body-Building Foods	Mineral or Regulating Foods	
Starches	Sugars	Fats		Lime or Calcium	Iron
Breads	Sugar	Butter	Milk	Cheese	Liver
Crackers	Molasses	Cream	Eggs	Milk	Spinach
Macaroni	Sirup	Cheese	Cheese	Buttermilk	Greens
Rice	Honey	Lard	Lean meat	Cottage cheese	Molasses
Cereal	Preserves	Bacon	Fish	Spinach	Bran
Tapioca	Jellies	Margarines	Poultry	Cauliflower	Beans
Sago	Dried fruit	Vegetable oil	Beans	Asparagus	Egg yolks
Potatoes	Candy	Peanut butter	Peas	Carrots	Prunes
Beans	Cake		Nuts	Molasses	Dates
Peas	Cookies		Cereals		Figs
Bananas	Desserts			<i>Phosphorus</i>	Raisins
				Cheese	Lean beef
				Egg yolk	Pear
				Beans	Cauliflower
				Whole wheat	Tomatoes
				Nuts	Carrots
				Oatmeal	Oatmeal

Roughage	Protective Foods			
	Vitamin A	Vitamin B	Vitamin C	Vitamin D
String beans	Butter	Grains of cereals	Oranges	Yolk of egg
Cabbage	Egg yolks	Spinach	Lemons	Vitamin-D milk
Turnips	Raw spinach	Cabbage	Tomatoes	Vitamin-D bread
Squash	Cream	Tomatoes	Grapefruit	
Celery	Tomatoes	Carrots	Raw cabbage	
Asparagus	Carrots	Dried beans	Rhubarb	
Lettuce	Yellow corn	Oranges	Raw carrots	
Spinach	Sweet potatoes	Lemons	Raw lettuce	
Onions	Lettuce	Milk	Yellow turnip	
Raisins	Raw cabbage	Apples	Apples	
Dates	Milk	Lettuce	Fresh peas	
Prunes	Cheese		Cabbage	
Apples	Yellow turnip		Lettuce	
Bran				
Carrots				
Parsnips				

EVERY PERSON SHOULD DRINK FROM FOUR TO SIX GLASSES OF WATER DAILY



*Food models made by the pupils*

These may be easily drawn and then cut out. If bent at the dotted lines they can be made to stand upright. Such models make it possible to play cafeteria easily

The next day Marian had a plan. "I think it would be fun," she said, "to play cafeteria right in this room. We could get some good training in that way. We might make some food models out of paper and mount them. Then we could go around with trays and see whether we were able to make a good choice the first time. There is one thing that I have discovered; and that is if you choose milk or something made out of milk, you get most of the necessary food substances in it. When I make my choice, I am going to be sure that I have milk."

"That would be great," said James. "Perhaps Miss Lyle, our art teacher, would let us take her period to make food models."



Everybody agreed that this would be a good plan, and Miss Lyle was pleased to give her consent. Before the end of the week the children had a play cafeteria in operation and were enjoying it very much.

"Miss Leader, would you tell us something about the lunches which some of us bring to school? We are very eager to get 'A' lunch cards too."

"How would you answer that?" asked Miss Leader, turning to William.

"Well, for one thing, pickles have almost no nourishment in them, and they are one of the highly spiced foods that we should try to avoid. Instead of a pickle in my lunch I prefer a delicious ripe banana."

"You are right, William," said Miss Leader. "Here are some of the things a well-planned lunch box should contain," and she wrote these suggestions on the blackboard:

*Milk:* Milk, cocoa, or milk soups may be brought in a thermos bottle; or custards or other foods cooked with milk may be brought in a covered jar.

*Sandwiches:* Sandwiches are especially good because they are nutritious and easily varied. The bread of the sandwiches should be well spread with butter. The sandwich fillings may be made from cheese, cold meat cuts, eggs, tomato, or paste of peas, beans, or other vegetables. Sweet fillings are best made from dried fruits, nuts, and salad dressing. A lettuce leaf is always an added value to any sandwich.

*Salads:* Salads made of vegetables or fruit with lettuce, celery, or cabbage can be attractively made into sandwiches or carried in a small jar or container.

*Fruit:* Any kind of fruit is excellent: apples, oranges, peaches, pears, figs, dates, prunes. It may be brought fresh or it may be cooked and brought in a container.

*Dessert:* Cake, cookies, sometimes candy, cooked desserts (custards and tapioca in containers), are nourishing.

“Remember that it is always a good plan to have something hot at luncheon, whether you bring it from home in a thermos bottle or buy it at the school cafeteria.”

On the next Monday, the first day of the new plan, Miss Leader's room won a great victory. There were only five children who did not get the white cards.

“We ought to have a perfect record after all the training we've had,” said William.

“We will next time,” said one of the boys who had failed. “I will try very hard to have a perfect record every time.”

As the weeks went by, the boys and girls in the Abraham Lincoln School did better and better. Some of them had perfect records for many days at a time.

There was one thing that pleased Miss Leader and the children of the Work Together Room very much. They gained steadily in weight and looked so healthy that even the other rooms in the building noticed this.

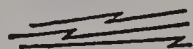
At the end of the year Miss Wise spoke to the children again in the assembly about their training in food habits. Can you imagine what she said? Write in your notebook the speech that you think she might have made.

## THE HEALTH BULLETIN BOARD



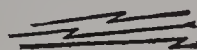
CORNELIA HOFF

William asks whether we should expect to go on all our lives thinking about proteins and vitamins every time we order a meal. "No, William." After a time—in fact, after this year—I expect you to have formed such good habits that you will seldom think of those things.



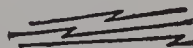
*Judith Leader*

During the vacation last week I visited a school in the country at luncheon time. Each pupil had a paper napkin and a glass of milk on his desk. There was a hot soup served from the top of the stove. Every pupil had a rosy red apple for dessert. In the health classes in that school the children spend a good deal of time talking about the value of different foods and planning the school lunches.



*Ruth*

We Boy Scouts are going on a hike Saturday. We are going to put on the bulletin board a list of the things we expect to put into our lunch boxes. Perhaps the girls will criticize the list.



*Arthur*

Wouldn't it be a good plan to rearrange our cafeteria and put a "hot counter" first instead of cookies and sweets? Then pupils will not come to the sweets first, as they do now, and be tempted to spend their money on them. Let us put the sweets way down at the end.

*James*



Mother says that I may be her assistant next week. I shall plan balanced meals and shall keep account of what I spend, to find out the cost of the food. This ought to give me some practice in arithmetic.

*Vittoria*



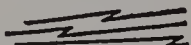
WANTED: A buyer of food supplies for the Work Together Cafeteria. Apply by letter.

*Work Together Room*

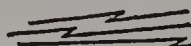


Mother has promised me that I may prepare breakfast Sunday morning. Would you like to know what I am planning?

*Dorothy*



I read in a book how the name *supper* came into use. In ancient times the last meal of the day consisted only of soup. From *soup* came *sup* and finally *supper*.



*Grace*

Last week I had a chance to visit a one-room rural school. It didn't have a cafeteria like our Chew-Chew Inn, but the teacher and the children were very clever in finding a way to serve hot luncheons. The stove that heated the room had a flat top. At recess the teacher put two quarts of water in a boiler. Into the bottom of the boiler fitted a wooden rack. I found that every pupil had brought a jar of food cooked by his mother, — foods such as soup, vegetables, stews, and pudding. Each jar had a screw top and held about a cupful. The name of the pupil to whom it belonged was scratched on the cover. The covers on these jars were slightly unscrewed (do you know why?) and set into the rack. The boiler was covered tightly and placed on top of the stove. At noon these jars were distributed to the children, who ate the hot, appetizing food from the jars with the spoons which

they brought from home. After the lunch was over, every pupil put his empty jar and spoon back into his lunch box and took them home to be washed.

Don't you think this plan was very clever? Notice all of its advantages.

1. This plan made it possible for every pupil to have a hot luncheon. The teacher called it the "hot jar" method.

2. It was entirely safe. Each pupil used his or her own jar.

3. It made little expense. No special cooking utensils were needed. No extra fuel was required. The boiler was contributed by a parent, and the rack was made by two of the children.

4. The teacher said it helped the children to gain in weight. Why?

Perhaps you can think of some other reasons why the "hot jar" method was a good one.

*Helen*



Let us arrange these foods into a good breakfast, a good luncheon, and a good dinner. Then shall we bring our lists to class to talk them over? Perhaps you will want to add to your lists.

Baked potato	Lettuce	Carrots
Cocoa	Glass of milk	Whole-wheat-bread toast
Custard	Rye bread	Oatmeal
Butter	Glass of milk	Sponge cake
Bananas	Scrambled eggs	Graham bread
Baked chicken	Butter	Celery

*Judith Leader*

## XXVI

# *The Preservation of Food, or Keeping Food from Decay*



TODAY we are to hear one of the most interesting stories that have been broadcast this year.

*[It was Marian about to introduce the speaker of the day in the regular weekly broadcast.]*

You all know how things decay in the world around us. It is fortunate that there is such a thing as decay. Think what would happen if there weren't! The dead leaves alone would finally pile up so high that the trees could not live. As it is, vegetable matter rots and disappears and, in rotting, helps to fertilize, or increase the nourishment in, the soil. But decay is not always a friend to man, for it destroys good food. You have all discovered by this time that if a bottle of milk is left in your warm kitchen overnight, it is very likely to be spoiled by the next morning. Man has always found it hard to get enough food to eat, and he has had almost as hard a time finding ways to keep his food from spoiling. Perhaps even this winter you have heard your father or mother complain




about the way the apples were spoiling; so you see the problem is still with us.

In taking up this subject our committee decided that we should ask Miss Louise Reynolds, who has classes in cooking at the Abraham Lincoln School, to give us a talk on the preservation of foods. Miss Reynolds has consented to do so. I have the honor to present Miss Reynolds.

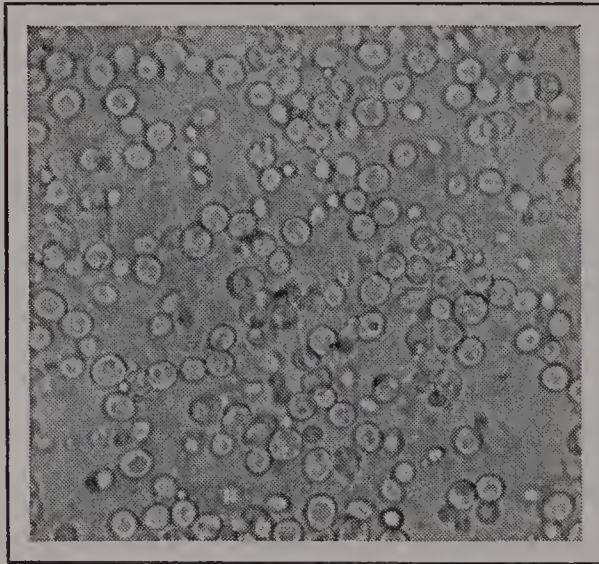
[*Miss Reynolds began:*] Boys and girls, all that Marian has said about the need of preserving food is true. Although man has always known what decay is and has had to find ways of fighting it, he never really knew what caused it until the microscope was invented. A Dutch scientist by the name of Anton van Leeuwenhoek, who lived in the seventeenth century, did much to perfect the microscope. After experimenting with different lenses he was finally able to produce an instrument through which he could see forms of life that had never been seen before. We call these forms of life microorganisms, because they are organisms, or living beings, so small that they can be seen in most cases only through a microscope.

There are three general groups of microorganisms that cause food to spoil: yeasts, molds, and bacteria.

Yeasts are microscopic, or very tiny, plants that are both friends and enemies of mankind. As friends they have had, from the very earliest times, an important place in the making of bread. Mixed with sugar and water and kept in a warm temperature, yeast gives off a gas called carbon dioxide. In bread-making this

 gas raises the dough, making it increase in size and become light in weight. The importance of yeast to the baker can be readily understood.

Like many other things yeasts have great value in the right place, but are troublesome and damaging in



*The yeast plant under the microscope*

How do yeast plants help your mother in her baking? Do they ever trouble her in canning fruit? How?

the wrong place. When yeasts attack good foods and make them ferment, they are the cause of great loss. This action of yeast is likely to occur in any sweet food when the temperature is warm and when the moisture conditions are suitable. The stewed fruits have especially to be watched. Fruit juices and sirups are most liable to the attacks of yeasts. The

value of foods is destroyed whenever these microscopic forms of life are permitted to grow in them.

Most of us are familiar with molds; for when they are present in large quantities, they become visible to the naked eye, frequently appearing as a white or gray-green furry growth. They grow rapidly in a warm, damp atmosphere. Molds are never found in a dry air or in the sunshine.

Everyone is familiar with the mold that grows on bread. When molds develop on bread and other foods,

they make their way into the foods, dissolving and taking up food substances and throwing off into them waste products that cause food decomposition, or decay. Such foods then become objectionable to the taste and, when eaten, frequently result in illness.

Molds shed spores, which, like seeds, bring about further growth. They are very minute in size. They are carried in the air; and if they lodge on a moist food surface at a warm temperature, they begin growing. But, as with yeasts, if the temperature is low their growth is checked, as is the case with the growth of plants, flowers, and trees in winter.



*Mold growing on a piece of bread*

Are molds ever friendly to man? How are they harmful? How do they grow? How do they go from place to place? May their growth be checked?

The third class of microorganisms that cause food to spoil is bacteria. Bacteria are plants, just as yeasts and molds are. They are the smallest and most harmful of the microorganisms. They are found widely scattered in great numbers in the air, on our bodies, in water, and in food.

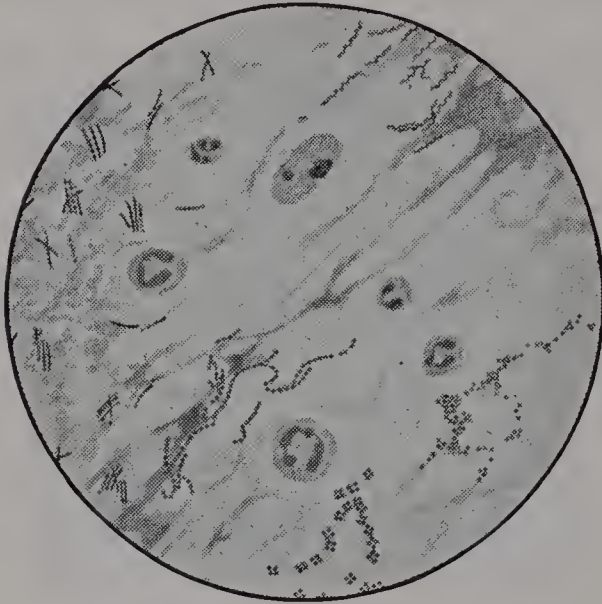
There are many different kinds of bacteria. Some are helpful. Many processes of plant life are dependent upon them. One class of bacteria takes a gas known as nitrogen from the air and changes it into







a form that can be used by growing plants. Dairy products such as cheese and fermented or sour milk are manufactured with the help of bacteria. Certain industries, such as tanning, would be handicapped without them.



*Tiny plants called bacteria*

They are the smallest plants in the world. Where are they found? How do they help man? What harm may they do? What do they need for growth? Does the drying or canning of food have anything to do with bacteria?

There are other kinds of bacteria, however, which do nothing but harm. They cause the loss of enormous sums of money, — especially when they grow in food, changing it so that it becomes unfit for use; and they cause diseases such as typhoid fever, diphtheria, tuberculosis, and pneumonia.

Under favorable conditions bacteria grow at an extremely rapid rate.

These microorganisms can double in number every twenty to thirty minutes. But they must have food material, warmth, moisture, and, in most cases, air. The condition that makes bacteria grow the fastest is warmth. It might be well to mention here that, contrary to general belief, low temperatures, even freezing ones, do not ordinarily kill bacteria but merely check their growth. As soon as the temperature rises, the bacteria begin to grow again.

As we suggested at the beginning of the broadcast, and as you probably already know, man has always tried to find ways of preserving food. Sun-drying was one of the first methods employed. In ancient times sun-drying was very common in the Far East. Raisins, figs, prunes, and fish have been found that scientists tell us were dried many centuries ago. In the Gobi Desert of China dried foods and primitive drying implements have been found which, scientists are able to tell us, show that man had learned to dry his food thousands of years ago. We know that the early Phœnicians, the Greeks, and the Romans sun-dried their foods. Their armies were supplied with such food in all their wars in Africa and Europe. Smyrna figs, Greek currants, and Algerian dates were all used then as they are today in the United States.

You see, man has known for a long time that those foods in which the amount of moisture is small are not likely to spoil. Nature herself was his teacher. She preserves the germs in seeds and nuts by the simple method of removing the water. Early man must have noticed that the life of cereal grains and of many other seeds seemed to have no end.

This method of preserving foods by drying them is still in use, although it has, of course, gone through many changes. Plums, apples, and pears are today artificially dried in ovens on wooden trays. Dried vegetables, including potatoes, corn, peas, lentils, carrots, onions, French beans, and cabbages, are also manufactured. The drying of meat, which was





so common fifty years ago, has almost disappeared. Canning and cold storage have taken its place.

An important advance in the study of food preservation was made by Louis Pasteur, a French scientist, who found, among other great discoveries, that the spoiling of food could be slowed down by killing with heat the germs present in foods. Few bacteria can live beyond 167° Fahrenheit. In cooking, therefore, food becomes sterile, or free from germs. It remains free from germs until it receives a fresh crop of them from the air. By repeated cooking all food can be indefinitely preserved. The housewife may not always know why she cans food in the way she does. By cooking fruit, putting it into jars that have been sterilized in boiling water, and covering the jam with thin paper or with melted paraffin or securely capping the jars, she has made decay impossible by barring the road to bacteria and other organisms of decay.

Today the canning of food has become a great industry. There are few fruits, vegetables, or meats that we cannot buy in cans at the store. Nowadays the canning of foods is so carefully controlled that there is no real danger of poisoning.

Besides the processes of heating and drying, there are certain substances that are enemies to germ life. Salt is one of the oldest known. Salt collects water. Notice how the salt in your saltcellars becomes so damp in moist weather that it will not shake out. Therefore bacteria either die or become weak in a salt solution, because the salt solution draws out of them



the moisture which they need for growth. The same thing is true of strong sugar solutions. Sugar too draws water out of bacteria. Notice that the housewife often adds sirups to her fruits when she preserves them.

Everybody knows that salt can be used to prevent fresh fish from spoiling. The farmer often preserves his pork, after butchering, by placing it in salt brine. Salt has the great advantage that ordinarily it is not injurious, can quickly be discovered by taste, and is easily removed by soaking. Wood smoke, which depends for its preserving power upon special substances in the smoke, is sometimes used to preserve certain foods.

We have already said that cold is an enemy to bacteria. Thousands of years ago there lived in certain parts of the world a huge creature known as the mammoth. Today men come across skeletons of the mammoth from time to time. Not long ago a mammoth was discovered buried in the ice in the northern part of Russia. It was so well preserved that dogs ate its flesh with keen enjoyment and without harm. The cold had acted as a preservative.

Long before refrigerators were dreamed of, man had discovered the value of cold as a preservative. The primitive method of keeping foods by putting them into cold cellars or wells is still practiced in many places. We now know, as we mentioned earlier in the broadcast, that cold probably kills only a small number of bacteria. The others rest, and may become active when the temperature is raised.





© Field Museum of Natural History

*The mammoth lived thousands of years ago*

Some mammoths have been found in the frozen North so well preserved that dogs enjoyed their flesh



The use of modern refrigerators enables us to keep food in good condition for a reasonably long time without the aid of any preservative substance. Their use today marks a great advance in the science of preserving foods. In 1775 Dr. William Cullen invented the first machine which produced ice by mechanical means, and in 1850 Dr. John Gorrie of Florida secured the first patent for the practical process of manufacturing ice. In the same year Dr. Ferdinand Carré, a Frenchman, introduced the first ammonia machine for the manufacture of artificial ice. Today, with an actual annual sale of 57,000,000 tons of artificial ice in America as a means of preserving food, we find science guiding the important problem of chilling food to preserve it.

Refrigeration by machine makes it possible to keep the temperature of food during storage at any desired degree in all climates and seasons. This means that food can be carried long distances with perfect safety by refrigerator transportation.


Many states have now satisfactory cold-storage laws. Millions of pounds of cold-packed fruits, butter and eggs, frozen fish and meats, are annually eaten not only without injury but with real benefit to our national health. The typhoid group of bacteria, however, must be specially guarded against, for they may live long periods of time in ice. Great care must be taken, therefore, not to refrigerate or freeze impure raw products.

A remarkable machine for preripening shipments of fruit has been used recently. *Preripening* means ripening ahead of time. It is the means of providing the markets with out-of-season fruits and vegetables the year round. The preripening machine forces a powerful current of air containing a gas, ethylene, over the ice at each end of a refrigerator car and through the crates of fruit which have been packed into it. The circulation of this gas continues until the temperature of the fruit itself falls to 36 or 38°. The arrangement of the crates permits the forced draft to search out and cool every cantaloupe, tomato, grape, or berry in the car.

The inventors of the machine have worked out a process by which ripening is halted as soon as the fruit reaches the point where it is ready for sale.





 Thus, although the Easterner's delicious June-breakfast cantaloupe was picked green three thousand miles away under a broiling sun, it has arrived in the New York market as sweet, juicy, crisp, and cool as though it had been trucked in that very morning from a garden patch not ten miles away.

By this same special process celery stalks can be whitened, sweetened, and made crisp in a comparatively short period after they have been loaded into the car. Only four days are required to "crispen" wilted stalks so that they will snap off like match stems, and two additional days will blanch them much whiter and cleaner than the old field process.

Certain fancy brands of tomatoes and some fruits are wrapped individually in paper before shipping, but the new process can ripen through the paper.

Grapes, which are shoveled into the car in one great mass, suffer from mold during the trip. Formerly this mold was fought by burning sulfur in the car. Now the precooling machine can send sulfur fumes through and through the entire mass of grapes and bring its temperature down at the same time.

In cold climates this same apparatus is used as a preheater, requiring about six hours to heat a car of apples. Its value is easily seen when one realizes that several thousand dollars may easily be lost when a shipment of canned peaches freezes solid on the way to its destination.

Such fish as sardines and salmon are preserved by being packed in olive or other oil.

The preservation of the most important dairy product, namely, milk, deserves a separate notice. Because of the changed flavor which long-continued boiling gives it and of the fact that milk forms perhaps the best medium for the growth of bacteria, there is exceptional difficulty in its sterilization, that is, in making it free of germs. As produced by a healthy cow it is a perfectly clean fluid, and when the cow is milked under very clean conditions and the milk is kept clean, it remains fresh and sweet. The introduction of bacteria at the time of milking arises from some lack of cleanness in the animal, the stable, the milker, or the milk pails or cans. In animals suffering from tuberculosis the milk may be infected as it is drawn from the cow. The first step after milking is the filtering of the milk or cream, which means passing it through cloths or, better still, the sending of the milk through centrifuges, — machines which remove dirt through rapid whirling. Pasteurizing is the process which destroys bacteria in milk by heating the milk to  $145^{\circ}$  Fahrenheit for thirty minutes and then quickly cooling it. By repeated heating complete sterilization may be brought about, although a single treatment is sufficient to make the milk safe for a few days. Unpasteurized milk rarely contains less than 50,000 bacteria per cubic centimeter, and often many millions per cubic centimeter. A cubic centimeter is about 16 drops, or one fourth of a teaspoonful. Pasteurized milk should never contain over 20,000 bacteria per cubic centimeter. Many forms of apparatus for pasteurizing milk are now in use.



Condensed milk has for many years found a wide sale. The first efforts to preserve milk in this way date from 1835. The commercially successful manufacture of condensed milk began in 1856.

In making condensed milk, sugar is usually added, and the milk is then poured into large pans, where it is evaporated at about 122 F. The milk is boiled down to such a point of evaporation that, though rarely quite sterile, it keeps for a long time. Unsweetened condensed milk is known as evaporated milk. Condensed milk and evaporated milk are sold in tin cans. The preparation of these two kinds of milk forms one of our most important branches of manufacture.

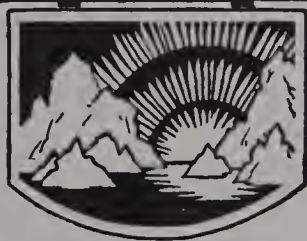
A milk powder is also manufactured by rapid evaporation, a process which makes use of steam-heated revolving iron cylinders. Milk powder made from skimmed milk keeps well for a considerable period. Milk powder is largely employed in the manufacture of "milk chocolates."



Then in a few words more the speaker went on to tell about man's victory over the unseen world of bacteria. This is what has made it possible for him to win one of his greatest battles: the keeping of food so it will not spoil. In closing, the speaker asked the children to find out how many ways there are to keep food from spoiling.

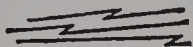


# THE HEALTH BULLETIN BOARD



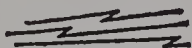
• CORNELIA HOFF •

I have some bulletins on canning and the preservation of foods. I got them by dropping a card to the United States Department of Agriculture, Washington, D. C., and to our own state Department of Agriculture.



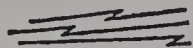
*Nancy*

We are getting up a group to visit a cold-storage plant in order to see how foods are preserved. Give your name to Miss Reynolds, who is arranging the trip. Next week we are going to visit one of the large milk-pasteurizing plants.



*Richard*

Who can give me an eleven-letter word meaning to keep cold, as in an ice box?



*Elaine*

I learned many new words in today's broadcast :

microscopic

decomposition

bacteria

ferment

molds

nitrogen

microörganism

sterile

preservation

filtering

ethylene

sterilization

Name some that were new to you. What do they mean?

*Helen*

## XXVII

### *The Story of Cooking*



IT MAY seem a little odd to you to hear a boy broadcast about cooking; but it needn't, for most boys today want to know something about this necessary art [*It was Marian speaking in the health broadcasting hour.*] Many a boy has been of real help to his mother by preparing the breakfast or the dinner when his mother has been ill.

Last week one of the boys in our class asked his mother if he could have two other boys for company over the week-end. "We will all help," he said. "We will get the breakfast every morning." The mother gladly consented to the plan.

Then, too, nearly every boy goes camping, and he needs to know something about cooking to be a good camper.

May I present Edgar Ross, who will tell you the thrilling story of cooking?

[*The next voice was that of Edgar:*] Did you ever think how great and how many are the blessings of fire? Try to think of a world without fire. Suppose we should wake up some bitter cold morning and find


that all the fires in the world were out and that there was no way of relighting them, that the art of kindling a fire had been lost. We should all soon be shivering with the cold, for our stoves and furnaces could give us no warmth; we should all soon be hungry, for we could not cook our food.

There never was a time when the world was without fire, but there was a time when man did not know how to kindle fire; and it was a long, long time after he had learned how to kindle one before he learned how to kindle one easily.

Fire was first given to man by nature itself. When a forest was set on fire by the cinders from a neighboring volcano or when a tree was set ablaze by a thunderbolt, nature, we may say, struck a match. In the early history of the world nature had to kindle all the fires, for man by his own effort was unable to produce a spark. The first method, then, of getting fire for use was to light sticks of wood at a flame kindled by nature.

In the course of time a man somewhere in the world chanced upon a way of kindling a fire without having any fire to begin with: that is to say, he found a way of producing fire by artificial means. He knew that by rubbing his hands together very hard and very fast he could make them warm. So he experimented with sticks, and learned that by rubbing two pieces of wood together he could make them warm too. Then he asked himself the question, "Can I kindle a fire by rubbing two pieces of wood together, if I rub them

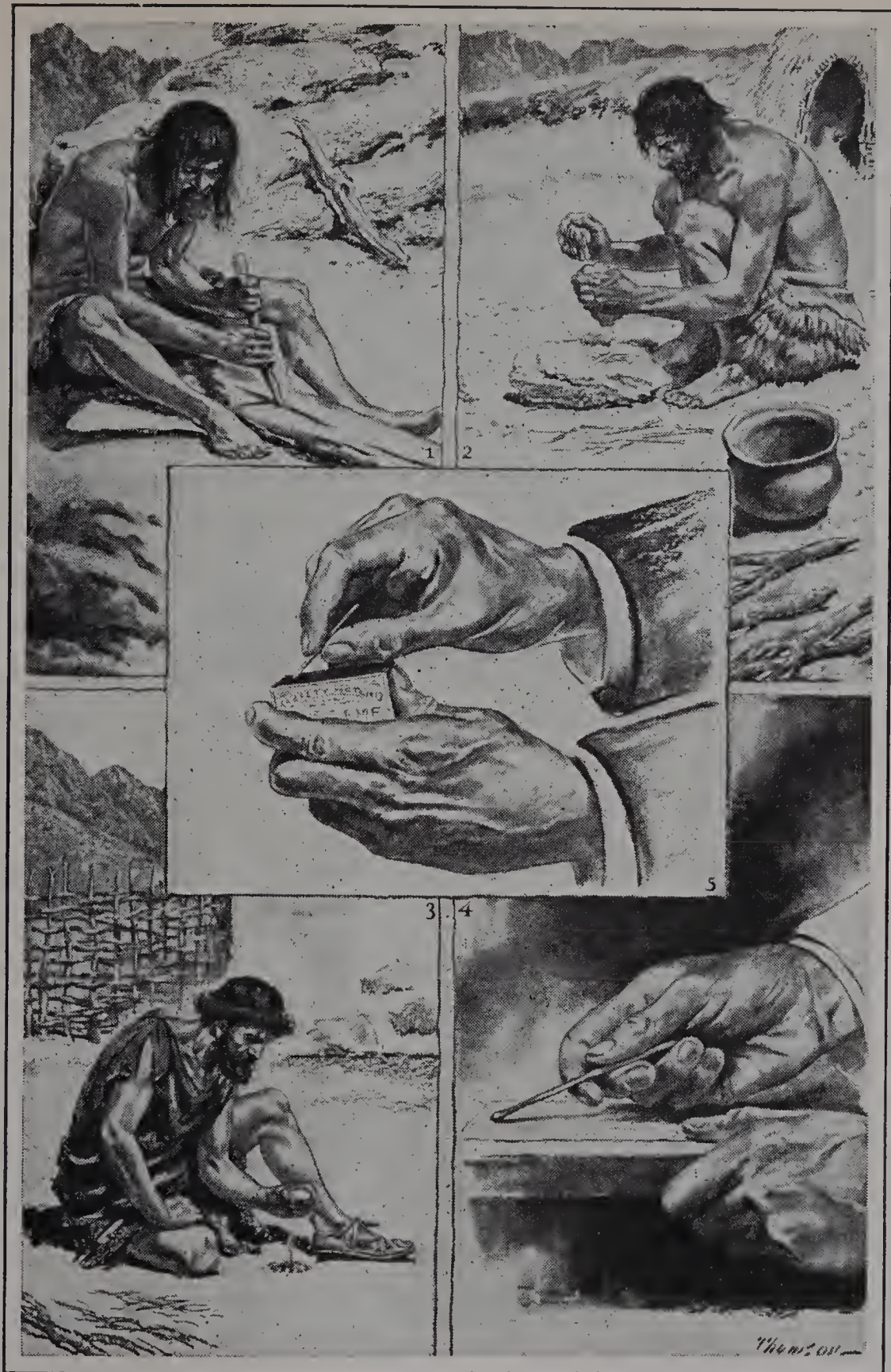


 hard enough?" He placed upon the ground a piece of perfectly dry wood and rubbed it with the end of a stick until he wore a groove in it, in which had collected a fine dust of wood — a kind of sawdust — from the rubbing. He went on rubbing hard and fast, and soon the dust in the groove began to glow! Then he placed some dry grass upon the embers and blew the embers with his breath, and the grass burst into flame. For the first time man had kindled a fire himself.

The second step in fire-making was man's discovery that a spark could be made by striking together a stone and a piece of iron ore. He let sparks made in this way fall into small pieces of dry moss or powdered charcoal and found that the tinder, as the moss or charcoal is called, immediately caught fire. It glowed, but did not blaze. Next he held a dry splinter in the glowing tinder and fanned or blew the tinder with his breath, and the splinter burst into flames. This way of getting a blaze, the strike-a-light method, took less work and less time than the first method. Discovered many thousands of years ago, it has been used by nearly all peoples of the world.

The third step in kindling fire was the method of the ancient Greeks, who used a burning glass, or lens. The lens focused the sun's rays upon a substance that would catch fire easily and so produce a blaze.


In the nineteenth century — the century in which so many wonderful things were done — the fourth step in the mastery of fire was taken. In 1827 a druggist in a small English town tipped a splinter with



### *How man learned to make fire*

Read pages 295–298 carefully, so as to be able to describe to the class what took place in each of the five pictures above



 sulfur and two other substances and rubbed it on sandpaper. It burst into flame. The druggist had discovered the first friction-chemical match, a match that begins to burn when the substances with which it is tipped are rubbed. This is the kind we use today.

To avoid accident by matches, the safety match has recently been invented. The safety match does not itself contain phosphorus. The phosphorus is mixed with fine sand and glued to the side of the box in which the matches are sold. The safety match cannot be lighted unless it is rubbed against the phosphorus on the outside of the box. It is so much better than the old kind of phosphorus match that it is driving the latter out of the market. Indeed, in some places the law forbids the sale of any kind of match but the safety match.

The story of the growth of the easier ways of satisfying man's food wants forms a large part of the history of civilization. Ages ago men ate their food raw. If they killed a wild animal, they tore it to pieces and devoured it. Some savage tribes do this today. The native tribes of Australia, for instance, know but little about cooking. A part of their food is worms, which they dig from the trees and eat raw. The Abyssinians eat raw meat; and there are other Africans who live largely upon roots, wild vegetables, and fruits. Some of these people are not different from the savages of the distant past.

It was some time before men learned that cooking improves food. How they found out we do not know.






## *Bo-bo discovers roast pig*

Have you read about Bobo in one of the interesting stories of Charles Lamb?

It may have been in some such way as Bo-bo, the Chinese boy, discovered roast pig, in the story by Charles Lamb. Bo-bo was the son of the swineherd Ho-ti; and, as you will remember if you know the story, he accidentally set fire to his father's house, in which some little pigs were kept. The house burned to the ground, and the pigs were roasted. Bo-bo felt one of the sizzling bodies to see if it still had life; and as it burned his fingers, he thrust them into his mouth. His pain turned to delight as he got his first taste of the juicy, crisp, browned skin of the pig, which stuck to them. He told Ho-ti; and, as the story goes, the two burned down house after house to get more roast pig. They were arrested, and at their trial some



 of the roast pig was given to the judge. A few days later the judge, who had bought some pigs of a neighbor, burned his own house. Others did likewise, until a sage discovered that a pig could be roasted on an ordinary fire. After this the roasting of pigs became common throughout the nation.

Of course this is only a story, but we do know that roasting was the first stage in the cooking of food, for it is common among all savage tribes. The next stage was probably baking. Holes were made in the ground and lined with stones. Fire was then built in the holes; and when the stones were red-hot, the food, wrapped in leaves or skins, was then laid on them and covered up to be cooked. Such bake ovens are common today in the islands of the South Seas. The savages of Africa too cook hippopotamus and elephant meat in red-hot stone-lined pits. An especially delicious dish to them is an elephant's foot placed in such a pit and allowed to remain until tender.

The boiling and steaming of food came later. Our American Indians sometimes cooked in this way. One tribe, the Assiniboin, were known as the stone boilers, because they boiled their food in water heated by red-hot stones. Having killed a buffalo, they skinned it and fitted the skin tightly into a hole in the ground. They next poured water into the skin and placed pieces of buffalo meat within it. Then having made a fire near by, they heated great stones in it and tumbled them into the water. In time the water boiled, and the meat was cooked. The development of the cooking of

meat led to the discovery of soups, stews, and sauces, while the treatment of cereals led to the discovery of bread.

There are places on the earth where nature itself furnishes plenty of boiling water and steam. The Yellowstone Park, for instance, has boiling springs in which one can place a basket of eggs and cook them and into which one can drop fish and bring them out ready to eat. In the hot-springs region of New Zealand there are pools of water which are always boiling, and also many cracks in the ground from which steam pours forth. In such places Mother Earth can be depended upon to do the cooking. The natives have only to put their food into boxes with bottoms made of a network of ropes and set them over the steam holes or cracks. In a short time the food is cooked quite as well as it would be in the steamers we have in our own kitchen cupboards.

In one way or another, as time went on, the people of the world learned more about cooking. Each tribe picked up things that other tribes had discovered about food-getting, food-keeping, and food-making. Their desire for different kinds of foods and more foods led them to trade with one another, and through such exchanges commerce grew up, and civilization too.

There are three good reasons for cooking food. First of all, since heat sterilizes, cooking destroys disease bacteria and so helps to prevent illness. Cooking softens food and makes it more easily digestible. Cooking brings out the delicious flavors in foods,





making them more appetizing in appearance and in taste, and in so doing further aids digestion.

Today we make use of all the different methods of cooking. Some foods lend themselves better to roasting than to stewing; others are better baked than boiled or broiled. Each method has its special advantages; but to be digestible, appetizing, and healthful, cooked foods should retain their flavor and also their mineral salts and vitamins.

The first stoves, as we have seen, were simply hot stones. Early man discovered that stone held heat, and used that discovery. Huge, round stones, some flat, some hollowed out, have been found, which appear to have been used for the purpose of cooking food. A large pot dating from a later period has been found, containing several smooth, round stones. It is by means of such discoveries as this that we are able to say that early man used stones in various ways to cook food.

In the days of the cave-dwellers the fire was built in the center of the cave, and the custom of putting the fire for cooking in the center of the home continued for a long time. Later the fire was moved to the side of the home; and in the twelfth century the chimney was introduced, which supplied a draft to lead the smoke and fumes out of the house.

Closed stoves of brick or of porcelain, or china, tile have been in use in Holland, Russia, Germany, and other northern countries of Europe since the end of the Middle Ages. Before that period there was no

way of leading the smoke out of the house; so the doors of cottages were made in two sections, the lower section kept closed to prevent the chickens and pigs from entering, the upper section swung open to let the smoke escape.

The early colonists in America did their cooking in open fireplaces. They had large swinging cranes on which they hung their pots. For baking they used brick ovens beside the fireplaces. In 1744 Benjamin Franklin invented the portable iron fireplace, which could be moved from place to place. To-day we have gas and electric ranges.



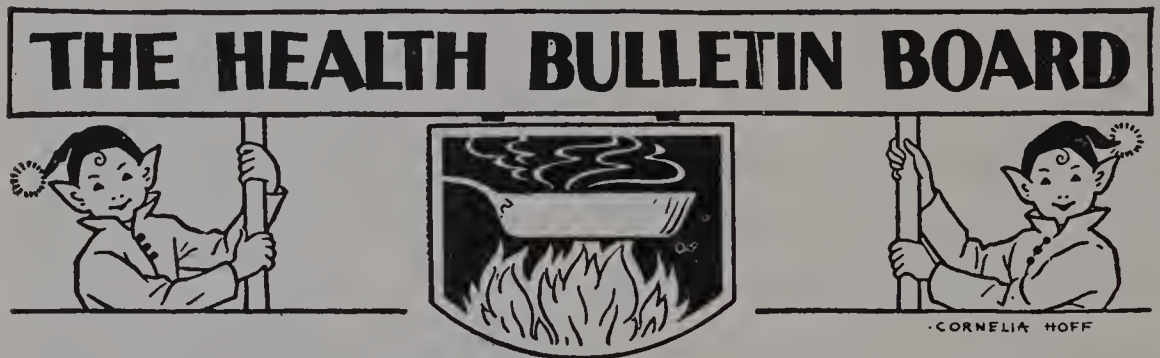
*Camp cooking*

Boys today are learning the fine art of getting good meals in the open

But what compares with the wholesome, delicious flavor of foods cooked out of doors plainly and simply in the primitive way — over a roaring bonfire or in hot ashes? Campers will tell you they prefer such food to the many highly seasoned and rich foods of the modern table.



The faces of the children began to wear hungry looks. The broadcast was so interesting and Edgar drew such lifelike pictures that the boys and girls could almost smell the food awaiting them in the cafeteria. For once, they could scarcely wait until Edgar stopped and Marian signed off for lunch.



### *How Much Do You Know?*

That was a good talk that Edgar gave us over the radio about foods. What did it teach you? To test yourself, try to answer the following questions:

1. How did man first know fire?
2. How did he learn to kindle fire himself?
3. What is there about a safety match that makes it safe?
4. Can you tell the story about Bo-bo and the discovery of roast pig?
5. Mention some foods that are better broiled than baked; better boiled than stewed.
6. Why do we cook food?
7. What is a chef?

Please add some more questions.

*Virginia*

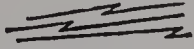
Will someone tell me the difference between *à la carte* and *table d'hôte*?

*Marcia*



I read in my mother's cookbook that the Italian people not only developed the arts of cooking and dining but were the first people to use forks.

*Gloria*



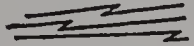
I learned three new words in today's broadcast:

appetizing

cranes

primitive

Name some that were new to you.



*Bruce*

I want to know more about camp cooking. Are fried foods harmful? Have you any recipes good for campers?

*David*

## XXVIII

### *Fighting Insect Enemies*



THE story we are about to listen to today promises to be one of the most interesting we have heard this year. [*It was Marian's voice introducing the speaker in the weekly health broadcast.*]

We have all heard or read those wonderful stories in the Old Testament. As far back as I can remember, I have wondered about the locusts that descended upon Egypt and devoured the crops. Perhaps we shall understand better what these locusts were if we think of them as a kind of grasshopper. What a remarkable sight it must have been, but what a dreadful thing for the people of that day!

Most people, I am sure, think of locusts as belonging to the past, but I have just read that they often threaten our own crops today in America. It may not be really true that in days gone by locusts were sometimes so thick in the sky that they darkened the sun; but one thing is certain, and that is that they have often stripped rich wheat fields bare in a few minutes. You can easily understand, then, that our food supply must depend somewhat on our ability to fight such



*Locusts swarming in Africa*

They have often been known to strip a field of grain in a few minutes

pests. It was not long ago that our United States Department of Agriculture, fearful that these pests would appear in certain regions, urged the farmers there to fight them with poisoned bran before the insects grew their wings and could fly away beyond human control.

I wish I could tell you some other things I have read just for fun about this interesting subject; but I must introduce the speaker of the day, who has made a careful study of insect pests. Miss Martha Holbrook, teacher of the science of biology in the Abraham Lincoln School, has kindly consented to address us this morning. Allow me to present Miss Holbrook.





[*Miss Holbrook began:*] Boys and girls, Marian has given you a good introduction to the topic of our broadcast. After what she has said, some of you may be surprised to learn that locusts have been used as food. In the Bible we find references to the eating of locusts and wild honey, and I understand that among some savage tribes locusts are still looked upon as something especially delicious. Possibly such a diet is satisfactory as far as calories and certain vitamins go, but we should scarcely enjoy such food.

In almost all parts of the world today there is a big battle going on between man and insects. These small forms of life may and really do destroy large quantities of food and carry diseases like malaria, yellow fever, and typhus. Today I want to tell you a little about the warfare going on between men and insects. It will require science, hard thinking, and work to conquer these foes of mankind.

Let us go on now with our story about the locusts.

Years ago two clever men studied the problem of controlling the locusts, and solved it. The remarkable plan which they thought out was solely the result of watching the ways of the locusts.

The young locusts always march in a straight line. What the men did, therefore, was to erect great screens of canvas in the path of the locusts. At the top of the screens they put smooth oilcloth. Now the locusts cannot climb over anything smooth. They climbed up the canvas, but on reaching the oilcloth they fell and crawled along the foot of the screen until they tumbled

into deep pits which had been dug every few yards at the sides of the screens. The pits were lined with polished zinc, so that, once in, the locusts could not get out. The men used 5000 yards of canvas and dug 26,000 pits. The result was that in the first year they caught 214,000,000,000 locusts, and in the following year 56,000,000,000 locusts. It cost \$135,000 to do the work; but as fifty cents spent meant 1,000,000 locusts destroyed, they thought the money well used.

Did you ever hear the story of the black crickets in Utah in 1848? Some of you will remember from your study of history that at this time the first settlements were being made in Utah. A large tract of land, about 5000 acres, had been planted to wheat and barley. Much rain had fallen in the spring, and everyone expected a fine crop. The pioneers were very thankful, for the previous winter had been a trying one.

Then came the report that crickets had been seen, and that they had already begun to attack distant sections of the grainfields. Within a week great swarms of them swept across the planted area, eating nearly every green thing in sight. Men, women, and children turned out to fight the pest. They drove the crickets into ditches or upon piles of reeds to which they set fire. They exhausted themselves in their effort to beat back the devouring host. But all in vain. Starvation stared them in the face. The people were frightened. A day of fasting and prayer was declared.

Then something happened that was regarded by many people as a miracle. From the islands







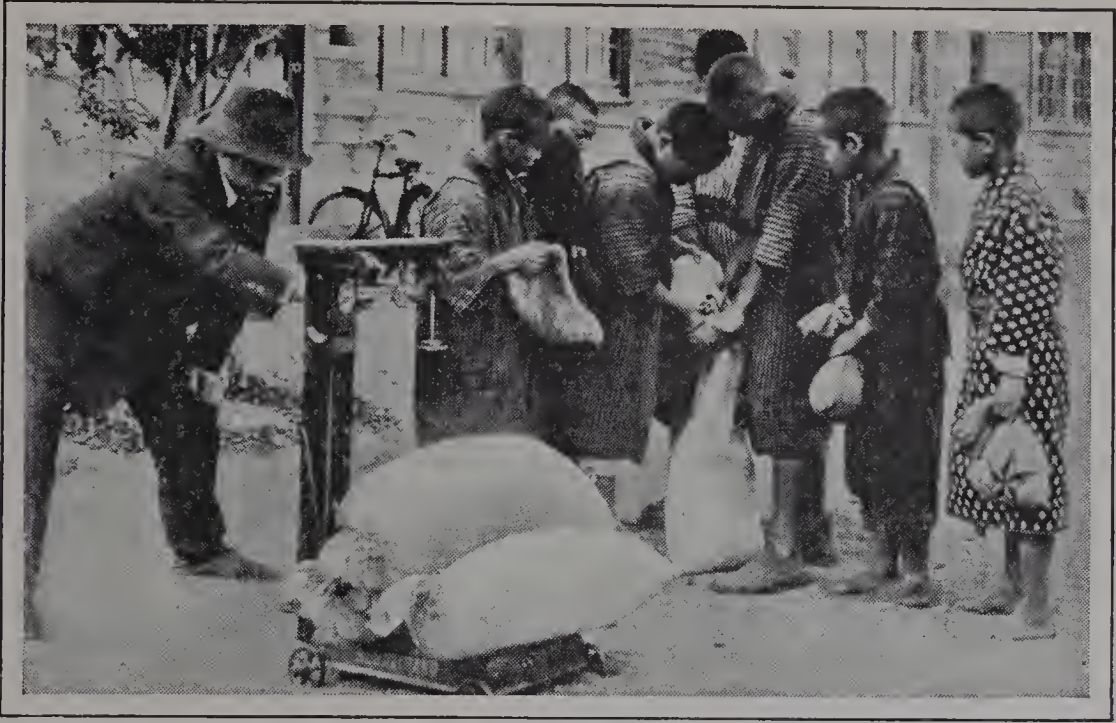
*Hunting grasshoppers in Japan*

Grasshoppers are so dangerous to young crops that men, women, and children turn out to pick them

☀ and the shores of the Great Salt Lake came flocks of snow-white gulls. At first the people feared that another foe had come to devour what little remained of their grain. Imagine how quickly their fear changed to joy when the white-winged visitors fell upon the crickets and began to eat them instead of the grain! For six days they stayed and fed upon the crickets; but on the evening of the sixth, which was Sunday, they flew back to their island homes. Some, though very little, of the grain was saved. There was enough, at any rate, to keep the people from perishing.

So it is not strange that the people of Utah are grateful to the gulls. A monument in Salt Lake City has





*Weighing grasshoppers after a hunt in Japan*

been erected in memory of their coming. The legislature has passed a law forbidding anyone to harm a gull. A gull has also been made the emblem of the state.

Few of us have any idea how important a part in the history of the world little insects play. Next to the poisonous snakes they are really more to be dreaded than any other form of animal life. There is nothing else living that does so much damage to property. A lion or a tiger is more terrible to face than a mosquito; but the innocent-looking mosquito may cause death as surely as the fearful man-eater, and the mosquito is not noticed until the damage is done. Beasts are big but, in comparison to insects, few; insects are little, but their numbers are more than men can count. What are the chief insect pests that threaten the food supply in your state? What insects carry disease?





How an insect pest begins is not always easy to say. We do know how one began, and we may gain from that example an idea of what happens in other instances. Up to about half a century ago the gypsy moth was unknown in America. Then an unfortunate thing happened. A man in Massachusetts was experimenting in his laboratory on gypsy moths that had been sent to his home from Europe, when suddenly a gust of wind carried a few of them out of the open window into the garden.

These moths laid eggs, which hatched; and the caterpillars became moths which laid many more eggs. So rapidly did they increase that within a few years the gypsy moth had spread over an area of many miles. Men tried in vain to fight the pest. The caterpillars swarmed over the trees and ate them as bare as if a fire had swept over the land. Over 40,000,000 trees were raided year in and year out in this way. The government of the state spent as much as \$90,000 a year for many years, but still the pest continues and robs Massachusetts of much wealth.

The Colorado potato beetle is another dreaded enemy of the farmer. It is a rather handsome little beetle, with its black-spotted orange coat, but it completely destroys the potato crop wherever it gets a hold. It was a native of the Rocky Mountain region. Until recent times it lived only on certain weeds, but in 1855 it was found among the potato fields of Colorado. From there it spread all over the country. Any person found with one of these beetles alive in



his keeping is heavily fined. This pest is dreaded in all parts of the United States.

It is evident to us that crickets, grasshoppers, and locusts are closely related, but who would think that cockroaches belong to this group? They do. Four members of this family are often present in our houses and are a hateful pest. The big reddish cockroach is common in the West. The "black beetle" first came from Europe. Another cockroach, a large brown one, came from Australia and is common in our Southern states. And the little brown "Croton bug," or "water bug," that is such a plague in our Eastern cities,



*The life story of the fly*

Notice the eggs, *a*. Each of these hatches into a grub, *b*, which later becomes covered with a hard case and is known as a pupa, *c*. From the pupal stage the adult fly, *d*, appears. What is the danger from flies? How may we best protect ourselves against them?

came from Europe. Cockroaches have a very unpleasant odor. They like to crawl over any food they can reach.

We need not go outside the house to discover one of the greatest of pests, the fly. The only thing that can be said in favor of flies is that they are good scavengers out of doors: they prey upon the decaying material on the surface of stagnant waters, which







otherwise would be much dirtier. But in the first place they destroy it very slowly, and in the second we ought to be ashamed to permit in civilized countries methods of cleaning up refuse that are found among savages.

Flies carry disease. The common house fly lays its eggs in refuse, where the grubs, or wormlike young, hatch and feed. Nothing is too bad for a fly to eat. It settles upon poisonous refuse, then, with some of the poison sticking to it, flies through an unscreened open window into a house, and there walks about over food, leaving dirty substances wherever it goes. It may poison the food and so cause many, many deaths. Flies are most abundant in the latter part of the summer, when, because of their number, they do the most harm.

Among the insect foes of man must be included some of the moths, or rather their young, for it is the caterpillar that does the eating. One of the most dreaded of these foes is a brownish moth known all over the United States and Canada. The caterpillar is an ugly greenish-brown. It feeds on corn, tomatoes, tobacco, and especially on cotton. In certain sections it is known as the corn worm or the tomato worm. In the South, where it does the most damage, it is called the tobacco worm, or more generally the cotton bollworm. This harmless-looking little moth and the boll weevil, or beetle, are the worst enemies of the cotton-grower. They cause him many hard days and sleepless nights.

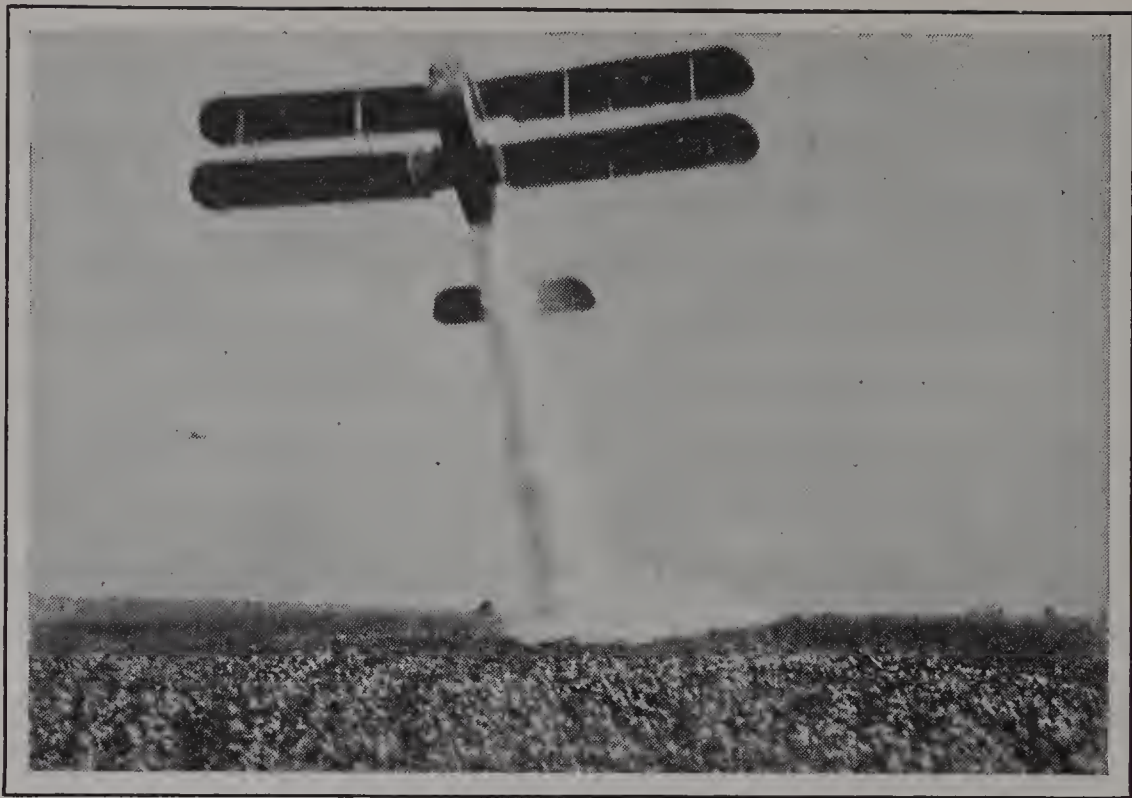
Another moth which in caterpillar form does an immense amount of harm is the codling moth. When we

hear the unripe apple fall to the ground in the summer, we know that the codling moth has been at work. Then the Boy Scout can perform many good deeds by gathering up the fallen fruit. If there are no horses, cattle, pigs, or chickens near at hand to eat them, grubs and all, he should see that the apples are destroyed. Or he may dress with bands of hay the trees that have been attacked. The hay soon becomes full of cocoons, which can then be easily burned.

Codling moths are not the only pests that fruit-growers have to fight. When we bite into an apple or a plum and find a fat, white, footless worm curled up in it, we throw the fruit away. It would be better, however, to destroy the grub, for it is the larva of either a curculio (or fruit beetle) or a weevil. It lives in the fruit until well grown. Then the fruit falls, the worm crawls into the ground, and by and by it appears as a fully developed beetle. These beetles are controlled to some degree by sprinkling the foliage early in the season (and repeating the process again in June) with liquids containing a poison called arsenate of lead. Fruits so sprayed (and this includes practically all) should be thoroughly washed before eating, in order to prevent poisoning.


If we wish to have good fruit, we must not leave rubbish lying about in the orchard or the garden to shelter these insects. The curculios curl up, drop off the trees, and pretend to die when they are frightened. To see them do this, all we have to do is to spread a sheet on the ground beneath the tree and jar





*Spraying crops by airplane*

This is an excellent way to fight some of the insect pests

 the tree slightly. After we have watched them do their trick, we can of course gather up the sheet and destroy the beetles. Plums, apples, and quinces all suffer from curculios. In some places gardeners have had to stop plum-growing altogether.


A great many members of the large weevil family are pests, but perhaps the worst of them all is the boll weevil. This insect, which causes so much loss, is a small brown beetle, only a quarter of an inch long, with a thick, round body and a blunt, beaklike snout. It came originally from Mexico. Now it has spread through Texas, Louisiana, Mississippi, Alabama, and Arkansas, and is making progress in other states. In places where it has been allowed to make headway



this little beetle has sometimes been known to destroy as much as nine tenths of a cotton crop.

You remember that the Lilliputians — that race of tiny men — made Gulliver prisoner by swarming over him in such numbers that they were able to bind him fast. It is in just the same manner that the insects called chinch bugs destroy acres and acres of grain. The farmer who finds young chinch bugs in his wheat looks about at once for a means of preventing them from reaching other crops, because he can do little with that special field, and he knows that when they have finished with his wheat they will make straight for his corn. They cluster in countless millions up the stalks of wheat and corn, as the Lilliputians did over Gulliver in the story, and suck the sap of the young plants until the plants die.

The grape-leaf hopper is our most common and widespread insect pest of the grapevine. Practically every vineyard in the United States and Canada is troubled by this insect. It sucks the sap from the undersides of the leaves, which soon turn brown and fall off before they should, leaving the vines unable to ripen the fruit properly. Commercial growers begin the battle with them in early July, which is the time when the greatest number are present on the leaves. They are easily killed by insecticides, — poisonous liquids or powder, — the only difficulty being to reach them with the spray on the underside of the leaves.

Other kinds of hoppers destroy the strawberry, raspberry, and other berry plants in the same way. 



During 1891, pear-growers in certain localities lost hundreds of thousands of dollars' worth of fruit. The attention of the Entomological Department having been called to the matter, inspectors were sent to visit these places. They found whole orchards whose trees were blackened as if scorched by fire. In preparation for the following season both field and laboratory experiments were carried out with feverish haste. Finally a special insecticide was made, and early in the spring all trees were bathed with the mixture. It did the work; the trees blossomed, the green fruit appeared, and the pears ripened in the fall. The battle against the pest known as the pear-tree psylla had been won.

There are five steps essential to putting an end to any insect pest. These may be summed up as follows:

1. Find out what the pest is. Know its life history; know when and how to work.
2. Determine the amount of damage the pest can do.
3. Determine how this damage is done, whether by chewing, sucking, or boring.
4. Determine the weakest stage in the life of the pest. Kill the pest when it is in that stage.
5. Determine the best spray mixture, and spray in time.

During 1915 a Californian who was an expert on insects happened to observe a little ladybug feeding upon a species of white fly. On the mere chance that this insect might take to the citrus white fly, a pest of citrus-fruit orchards, he secured a number of ladybugs and began to breed them. By 1917 he had three large

colonies. In the spring he turned them loose in certain citrus orchards. The beetles made a complete clean-up of the citrus white fly in those orchards. Since this famous battle ladybugs have been bred in large quantities and released over the entire state of California, with such splendid results that the citrus white fly will probably never be seen again in that state.

No insect enemy in history has caused such widespread fear among American farmers as the small, greedy caterpillar now known as the European corn-borer. This pest reached America in 1917, hidden away in the stems of baled broom corn which was imported from Hungary and Italy. Large shipments of the broom

corn were traced to Ontario, Boston, Amsterdam, and Buffalo, where these insects later developed in great numbers. A battle was started against the common enemy, and Congress voted to set apart \$250,000 to help in the struggle. Toward the close of 1920 at least 2400 square miles of the best farm land in the Dominion of Canada alone, and a total of 40,051



*Ladybugs raised to fight insect pests*

They proved to be a great friend to citrus-fruit growers. What is the chief food value of citrus fruits?







square miles in the United States, were held fast by the enemy. There was hardly a single field of marketable corn in all this region.

By the end of 1921 the borer had a strong hold on the country and refused to give up a foot of territory.

Now the fight was about to begin in earnest.

The Federal battle was started with the burning of all stalks and rubbish lying about in the fields. Hundreds of field-burners were put to work against the enemy. Thousands upon thousands of gallons of kerosene were spread over the territory troubled by this pest, and set on fire to cleanse and purify the land. Pulverizing machines, by pulverizing, or grinding to a pulp, what the fire missed, finished destroying all material



*European corn-borer in an ear of corn*

What damages did this pest do in America? How was it fought? Is this pest found in your own state?

that might be hiding the enemy. Soon eight hundred stubble pulverizers were busy destroying all corn stubble that was ten inches high or less, and consequently all corn-borers finding refuge in it.

By the spring of 1927 the results of the campaign showed a decided setback for the corn-borer. Over



*Damage done by the Mediterranean fruit fly in Florida*

Our national government fought this pest with great success

40,000 acres of land in the corn belt were cleaned up. The corn-borer is now held in check in every state in the area in which it was once so powerful, and no serious commercial loss to the corn crop has occurred in recent years. This triumph is due to the splendid work of the Federal government.

In 1929 the Mediterranean fruit fly was found in Florida. In a few years our national government spent \$6,355,000 to get rid of the pest, and with great success.

One of the cleverest ways of getting rid of an insect pest is to find another insect that is its enemy, as you saw in the case of the white fly. Thus some insects become friends of mankind. Often they do more than destroy other insects. Recently in Australia





a prickly-pear cactus was spreading over the land at the rate of a million acres a year. Before any way of checking its growth had been found, sixty million acres of valuable farm land were turned into a jungle. It has now been discovered, however, that the longhorn beetle and certain other insects will eat this weed pest ; so they are being bred in large numbers and released in the troubled area.

You now see what powerful enemies insects can be. They may seriously threaten our health, not only by carrying disease bacteria but also by destroying our food supply. Some scientists have said that it is a question which is the more powerful — insects or man. Science has already waged so many successful battles against insects that we may be encouraged to hope they will always be kept under control. But it is a warfare without end. If you will read your newspapers and magazines, you will find some interesting facts about the warfare against insect pests in our country.

I have read enough thrilling stories about battles with insects to be able to go on for a long time telling you about them, but it is time to close. I must say "Good-by."



"I wish we could read some of these stories of the conquest of our insect pests. Perhaps Miss Holbrook will put a list of them on our bulletin board or tell us more about them in the discussion period," said Marian.



# THE HEALTH BULLETIN BOARD

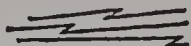


CORNELIA HOFF

My father is beginning to think about planting his garden. The other day he said, "It is hard to have a good garden these days, because there are so many pests." I told him about some of the things we had learned at school and asked if I might try to help him. In our library I found interesting books on garden pests, and the Department of Agriculture at Washington sent me some material, too.

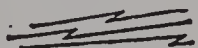
Do you know what to do for squash-borers, tomato worms, and potato beetles?

*Sam*



Since fruit-growers protect their crops against insects by means of poison sprays, I am going to be more careful than ever to wash thoroughly apples and pears and grapes and other raw fruits before I eat them.

*Lewis*



I learned three new words in today's broadcast:

insecticide

arsenic

scavengers

Can you name some that were new to you?

*Donald*



My brother Bill read in the *Science News Letter* an interesting thing about bugs. It seems that the word *bug* once meant "specter," or "ghost." Later it was used to mean insects and small creeping things. The idea of a ghost still lingers in such words as *bugbear*, *bugaboo*, and *bogie*.

*Olive*

## XXIX

### *How Plants Help*

IT WAS before school. Miss Leader had just taken off her coat and hat. The morning sun was streaming in through the windows. Ellen, who always came early, made a very pretty picture as she stood in the sunlight with a watering can in her hand.

"Oh, Miss Leader," she cried, "the bulbs are coming up! Do see this one. It has grown a great deal since yesterday. It won't be long before the flowers blossom. Aren't plants and flowers lovely?"

"Yes, Ellen, they are. I am so glad you enjoy them. Have you a garden of your own?"

"Indeed I have, Miss Leader. I have a little bit of land in our back yard. I have both flowers and vegetables in it. Then I help grandpa keep his memory garden."

"I have never heard of a memory garden. What is it? Tell me about it."

"Well, you see, grandpa has a little plot of ground that once belonged to my Aunt Mary. She used to grow beautiful lilies of the valley in it. Grandpa grows lilies of the valley in it, too, and calls it his memory garden. He sells the lilies every year. Last year he sold twenty-five dollars' worth. He used the money

to help children who needed warm clothes and milk. Sometimes he buys toys at Christmas and gives them to children who might not have any."

"What a lovely thing to do, Ellen! You and your grandpa must have many beautiful memories of the boys and girls you have helped to make happy."

"Yes, we have, but it is really grandpa who has done it all. I wonder if we mightn't start a garden like that in this school."

"That is a good idea," said Miss Leader. "I should just love to help."

"Good morning, Tom and Alice and Louise. Aren't the bulbs doing well?"

"Yes," said Alice. "Isn't it wonderful the way plants grow? I wish I knew more about it. How does the water we put on them get up into the plant? What do the leaves do? Oh, there are so many questions I'd like to ask!"

By this time more of the children were coming in. They joined in with "Please don't start yet, Miss Leader. We should like to hear about it, too."

"I guess everybody wants to hear about it, Miss Leader," said Marian. "Won't you tell us about plants this morning for our health lesson?"

Miss Leader consented, and the time for the health lesson found her standing behind the desk with one of the dishes of bulbs and a microscope before her.

"It is rather hard to tell you about the way plants live and grow, because there are so many things about them that no one understands.



"One of the most interesting things about this plant is the fact that it is alive. You can quickly think of some of the differences between things that are alive and things that are dead. One difference is that a liv-



*Luther Burbank*

A lover of plant life who grew many new kinds of flowers, vegetables, and fruits. He was a great help to the gardener and the farmer. Try to find out some of the things he did

ing thing can grow, but a dead thing cannot. A stone, for instance, will never get any larger. It does not grow, and it does not change except as the weather may finally wear it down. But you have seen this bulb change. At first it had no leaves, but now it has leaves and a flowering bud. How it grows every day! Some plants grow very fast; Indian corn, for instance, has been known to grow several inches in a single day or night. Another difference is that when

a stone is cracked or wears away, it cannot repair itself; but ordinarily a living thing which has been injured can repair itself. When you cut your finger or get a bruise, you know that the wound heals itself.

"One of the chief differences between dead things and living things is that everything that is alive is



*Cells grow by dividing*

Both plants and animals grow in this way

made up of what are known as cells. I have put a bit of onion skin under this microscope. Perhaps somebody will look at it and tell me what he sees."

"Please let me look, Miss Leader," said Tom.

"All right, Tom."

"Oh, Miss Leader! The onion skin is divided into little blocks all fitted together so that they look something like a stone wall. Are those the cells?"

"Yes, Tom. All living things are made of cells. The material within the cells, a substance like jelly, is called protoplasm. It is the protoplasm of any plant or animal that does the work. It is what grows, breathes, and throws off material which is not needed.

"I'm sure you want to know more about growth. Let me tell you about it by making some drawings on the blackboard. Growth is brought about by the dividing of cells. This is the way a cell may look before it starts to divide. It begins to divide in the middle, and finally breaks into two parts. Each part is then a cell, and grows until it is as large as the parent cell. Then each of these cells again divides, and so on. This is the way turnips, flowers, and children grow.

"Perhaps none of you ever thought of plants as factories. But they really are. With the help of the sunshine they work to change into living matter sub-

stances from the soil and the air. Did you ever stop to think that all creatures depend on plants? The cattle that furnish us with steak and milk eat grass and grain, and man depends on plants for his food, or on animals that in turn depend on plants."

"I had never thought of plants as factories, Miss Leader. Goodness, the work that plants do is really the foundation of the world's food supply, isn't it! Do tell us more about it."

"Let's think first about the materials which the living plant factory uses. The plant takes from the air the gas known as carbon dioxide, and from the soil in which the plant grows, water and nitrogen and other substances, like iron and sulfur. These are the raw materials which the plant factory uses. You know from experience how necessary water, at least, is for the growth of a healthy plant. Our bulbs wouldn't grow if Ellen forgot to give them water."

"I have heard my father speak of droughts that some parts of our country have had," said Ellen. "He says that then much of the corn and potato crops was destroyed because there was no rain."

"Plants must have water and food to grow, just like boys and girls," said Henry. "My Uncle Harry is a farmer. He puts fertilizer into the ground before he plants his seed, just as we did before we planted our bulbs. Fertilizer is material which helps plants to grow."

"But how do all these things that the plants need get together?" asked Albert.



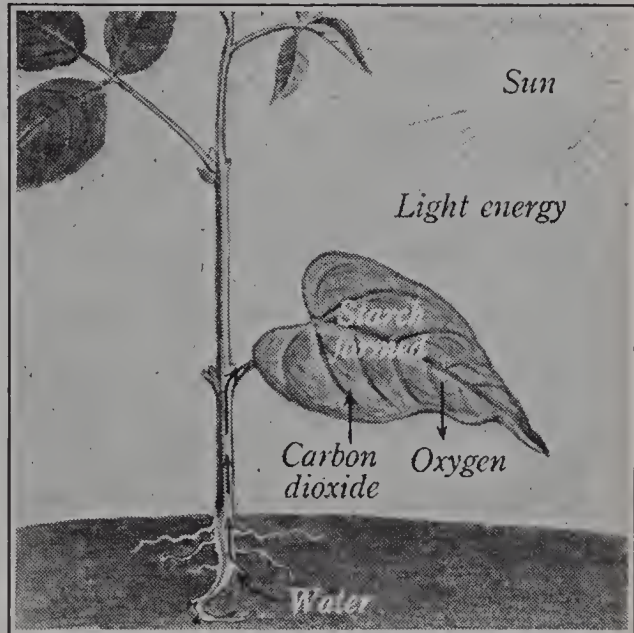
"Well, water gets into the plant through the roots of the plant. It first soaks into the finest root hairs and then into the larger ones, and is finally drawn up into the stalk of the plant itself. Then it is called sap. Dissolved in the sap are the substances from the soil.

The sap carries these food substances into the leaf, which is the factory. Since the water is being evaporated from the leaf surfaces of all plants nearly all the time, the supply must be constantly replaced.

"Carbon dioxide gets directly into the green leaves by means of special openings, or pores. But the carbon dioxide and the water with its

substances from the soil are not themselves food for a plant. They must first be changed from food materials into foods.

"How are these foods made? When the sun shines upon the leaves, chlorophyll, the green coloring matter in them, works in some way with the sap and the carbon dioxide so that sugars and starches are made. Sugar is made first. In the making of sugar, oxygen is given off by the plant. Some of the sugar and the starch which the plant makes is used by the plant



## *A plant is a factory*

Notice how starch is formed in the leaf from carbon dioxide and water. What else is necessary?

itself in living. If the plant has more sugar than it needs, the rest is stored away as starch.

"Don't forget that the plant couldn't make its food without the sunshine. During the night, when there is no sunshine, the green plants do not make starch, nor do they suck up so much water."

"Then plants are very much like people, after all, aren't they?" asked Fred. "They must have food, and it must be digested, or changed, to be used. Then it must be absorbed. And plants, like people, need sunshine to be healthy. There is just one thing I don't understand. We have learned that some plants contain proteins. You haven't said anything about proteins."

"That is a thoughtful question, Fred, and you have given us a good review of the lesson besides. I can answer your question best by saying that, in much the same way as sugars may be changed to starches and starches back again to sugars by the plant, the carbohydrates may be changed into proteins when certain minerals are present. Green peas and beans contain much protein."

"Did you have a question, Marie?" asked Miss Leader.

"No, Miss Leader," Marie replied. "I was just thinking that factory-owners are usually thought of as being rich, and that each one of us who plants a seed immediately becomes a factory-owner. The plant grows into a wonderful factory which, from the things it gets out of the water, soil, and air, will manufacture real foods,—foods that will help it to grow and also





*Public-school gardens in New York City*

Even in large cities school children raise thousands of dollars' worth of vegetables

help us to grow. We can own hundreds or thousands of food factories this spring by planting gardens."

"I hope that all who can will plant gardens this spring," said Miss Leader. "There are at least three reasons why we should be interested in gardening: first, we can raise fresher vegetables than those we often get in the market. Vegetables interest many of us quite as much as flowers, delightful as it is to have gay, sweet-smelling flowers in our garden. Then it will be fun to watch the plants grow. Finally, we shall learn many things about gardening, plants, and fertilizers that will be worth while. We shall find out how to



prepare the soil. We shall learn to be careful to plant fresh seeds, for only fresh seeds give the best results. We shall find out when and how to plant each kind of seed. We shall learn when and how to transplant. We shall have to remember that plants must have sun and air and that the garden must be kept free of rubbish."

It was nearly time for the bell to ring. Andrew Scott had taken a big book with a red cover out of his desk. He held it up.

"Miss Leader," said Andrew, "can you guess what I have here?"

"Well," ventured Miss Leader, smiling, "it looks like a seed catalogue. It has a very attractive cover."

"That's what it is," returned Andrew, "a seed catalogue. Just look at those delicious-looking tomatoes. They look good enough to eat. I shall plant some tomatoes in my home garden. Mother is very fond of green onions. I shall plant a good many little onions that will start to grow very soon and rapidly. Is there anybody who doesn't like green onions? I shall also plant some beet seeds. Young beets make good greens."

The other children crowded around Andrew. Within five minutes every boy and girl in Miss Leader's room was planning to have some kind of garden. There were always window sills in sunny living rooms or dining rooms, even if there weren't always yards. Miss Leader was delighted at the children's eagerness. As she and Marian went down to the cafeteria she said, "It looks as if we should have a specially big harvest this year, what the farmers call a 'bumper crop'!"

# THE HEALTH BULLETIN BOARD



CORNELIA HOFF

In our next lesson let us discuss some of the likenesses and differences between plants and human beings.

*Marian*

lychlpholor. What color am I thinking of?

*Cathleen*

Copy in your notebook and see if you can complete each sentence.

Plants must have \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ to grow.  
\_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ are minerals which help plants to grow.

The sun and the \_\_\_\_\_ manufacture \_\_\_\_\_ for plants.

*Dorothy*

Do you know the meaning of these words? Add them to your vocabulary.

protoplasm

chlorophyll

catalogue

*Richard*

Father has given me a chance to make some money. I am to have a garden of my own at home. I shall grow golden bantam corn. It will be easy to sell in the neighborhood.

*Martha*

### XXX

## *How the Government Helps*

IT WAS time for the weekly broadcast in Miss Leader's room. While the children were putting away their books and getting ready to listen, there was a knock at the door. Sally opened the door. A gentleman stood there with his hat in his hand.

"Good morning," he said. "Is this Miss Leader's room?"

"Yes," Sally replied. "Will you step inside?"

"Thank you," he said. "I was invited by a Miss Marian Hall to speak to your class today. My name is Dr. Powers."

"Oh, yes, Dr. Powers, here is Marian."

In a short time Dr. Powers had met Marian, Miss Leader, and several of the pupils.

"Boys and girls," said Marian, turning from the little group at the front of the room to face the class, "your committee has prepared a little surprise for you. Instead of having some member of the class address you through our weekly broadcast, the committee thought of inviting somebody in to speak to you. Our subject for today is 'How the Government Helps.' The gentleman who is to speak to you knows a great deal about this subject because he comes to us from our own



city department of health. He knows much about our city government, and also about our state and national governments. Let me introduce Dr. Powers."



Good morning, boys and girls. First, let me tell you how happy I was to be asked to address you. I am also delighted that your chairman and Miss Leader have invited me to take luncheon with you. I know I shall be sure to have something good to eat, and I am glad of the chance to see boys and girls carrying out some of the things they have learned. In many schools that I have visited, children learn from their books certain facts about health, but they do not put into practice what they have learned. I understand that you have had a wonderful year learning about foods and that you have training in your cafeteria in choosing foods. I wonder whether I shall be able to order an "A" lunch. If I can't, will you help me out?

Your chairman has asked me to tell you how the government helps make and keep the people healthy. I suppose you want to know about foods especially. Way back in colonial times the government was not obliged to pay much attention to health. Citizens lived largely on their own farms, where they were quite independent. They raised their own grain, fruits, and vegetables, and hunted in near-by forests for much of their meat. Berries and certain other fruits they found growing wild. Most of their honey came from hollow

trees where it had been deposited by swarms of wild bees. The settler had his own poultry, sheep, and cows. He was always reasonably sure to get milk that was fresh, and there was little chance of its being impure since it did not usually pass through the hands of those outside his own family.

How different it is today! Many of us live in towns and cities. Most of our food comes from a long distance and is handled by many people. For example, think of the milk that you use on your cereal every morning. It may come from a dairy farm only a short distance away, or it may come a long distance by train or by truck. Many people handle it before it reaches you. The cows from which it came may or may not be healthy, and the milkers may or may not be carriers of disease. The milk itself may or may not have the proper amount of butter fat in it. And so on. Some of our states have passed, along with other laws concerning the health of their citizens, special laws concerning the inspection of both cows and milkers to prevent disease. Your board of health makes rules governing the production and the sale of milk. Very often milk is pasteurized. This means that it must be heated to a certain point before it is bottled. This heating kills the bacteria that carry disease.

Under the conditions in which we live in our cities it is absolutely necessary for some branch of the government to look after our water supply and see that it is safe. In your city this duty is in the hands of the Department of Health. Water may be brought from

rivers, lakes, or ponds, or it may come from wells. No matter what its source is, care must be taken to have it filtered, run through beds of sand and charcoal to get rid of germs of disease, or purified in some other way. When a water supply has become impure, it may cause a very serious epidemic.

Today a large number of people eat at restaurants instead of in their own homes. If dishes are not clean, that is, washed in soapy water and rinsed in hot water, and if the dishes and the food are not handled by healthy people, there is great danger of spreading disease. Some cities require that all food-handlers pass a medical examination and that restaurants be inspected regularly.

Most cities have food-inspectors, who examine food to see if it is safe for people to eat. It is not unusual to see a milk-inspector stop a milk wagon and get a sample of milk for examination. If the milk is found



*A government meat inspector*

When meat is found to be unsafe, it  
is destroyed



to contain too little fat or too many bacteria, the sale of it may be stopped.

Many of our city or state governments have a department of weights and measures. It tests scales being used in markets, groceries, and other such stores, and so prevents the public from being cheated.

Each one of our state governments has a department of health, which has charge of most matters concerning the health of the state. It advises local boards of health. It collects information and publishes numerous bulletins. Many of these are about foods and food problems. Any citizen who wishes information on matters of health is always certain to get a helpful reply, through a bulletin or a letter, to any question he sends to the state department of health. Every summer I take my family to a place in the country. If we try a new place and have any reason to be afraid of the well water, we may send a sample of it to the state department of health for examination. They will report promptly whether or not it is safe to drink. This is one example of the many ways in which the state department of health may help the citizen.

Since the raising of garden and farm products is so great an industry and so necessary to the life of the people, most states have agricultural colleges where young men and women are trained to farm and garden according to the rules of science. They learn much about such things as the value of different kinds of soils, the enrichment of soil through fertilization, choice of seeds, dairying, poultry-raising, and canning. After

graduating from a school of this sort men and women are able to farm and garden with greater profit. They get better yields from the soil and finer products in poultry or fruit. Experiments are constantly being carried on in these colleges in order to discover new facts about agriculture and food products. Our agricultural colleges are interesting places. I hope some of you will visit your own agricultural college.

Every state also has its agricultural department. It issues bulletins and spreads helpful news among farmers and gardeners. Often members of this department give interesting radio talks about how to fight insect pests, how to get a heavy yield of wheat, and similar topics. By writing to this department any citizen of a state may get information on almost any question having to do with agriculture. Many of our agricultural colleges and state departments of agriculture employ agents to go out to the farmers and give instruction right on the farms themselves.

Our national government does much to protect the farmer and the gardener through its department of agriculture and connected departments. It stands guard, as you have probably learned, at all ports of entry, like New York, to prevent insect pests from being brought into the country; it distributes seeds to the farmers, carries on many experiments to find out how to get rid of insect pests already in the country, breeds better plants and animals, distributes bulletins, inspects meats and foods shipped in trade between the states, and enforces pure food and drug laws.

The weather bureau renders a great service to farmers and gardeners through its weather forecasts. These reach the public every day through newspaper and radio. They often help the farmer to save his crop. For example, Cape Cod, Massachusetts, produces many cranberries. Suppose that just at the time the berries are ready to harvest, the news comes from the United States Weather Bureau that there will be a heavy frost. Frost, of course, will destroy the crop. Immediately the cranberry-growers may set to work to let water into their bogs or build fires which will protect the berries from the frost. In this way they can harvest the crop safely.

You boys and girls have learned how valuable our food supply is. There are many things that we may live without, but we cannot live without food. Our local, state, and national governments take a keen interest in food problems. They help us to do many things that we cannot do by ourselves. But there is one thing they cannot do. They cannot compel us to drink milk, eat leafy vegetables, and form good personal health habits. These things we must be wise enough to do ourselves. I am told that this is a school where you really do such things.

I hope some of you will visit me at the City Hall, where I can tell you more about what your city is doing for the health of its people. It will make you feel very proud of Brightville.





## THE HEALTH BULLETIN BOARD



CORNELIA HOFF.

Our city, state, and national governments do so much for the health of American citizens that I wonder what we can do to help the government in its work.

*Judith Leader*

Let us work out a list of the things that our city, state, and national governments do for our health. We can put it into our notebooks. Here is a start. Let's see how many we can get before the discussion period.

### OUR CITY GOVERNMENT

1. Inspects all the dairies in the city.
2. Licenses all restaurant keepers.

### OUR STATE GOVERNMENT

Trains boys and girls in agricultural colleges.

### OUR NATIONAL GOVERNMENT

1. Does not allow any immigrant to enter who has an infectious or a contagious disease.
2. Publishes important bulletins on foods.

*Philip*

I am interested in seeing how stores in our neighborhood live up to governmental health laws. Who will make an examination of the stores with me? Please sign below.

*Ruth*

## XXXI

### *Learning from the Wild Animals at the Zoo*

IT WAS a day in June. The school year was rapidly drawing to a close. Through the open windows came the songs of birds. Off on the hillsides Miss Leader and her pupils could see the farmers working in the fields. It was the kind of day that invites one to leave one's books and go out into the great, beautiful world.

"I wish we could have our health lesson out of doors today," said Thomas.

"Wouldn't that be great!" exclaimed Alice. "Isn't there some health work we could do outdoors, Miss Leader?"

There was a twinkle in Miss Leader's eyes.

"I have a surprise for you," she said. "How should you like to make an excursion to the zoölogical gardens? I think we can learn something about health from the lions and tigers and giraffes."

"Oh, Miss Leader, it's almost too good to be true!" said Jane.

"You must thank Marian for this," smiled Miss Leader. "She thought of the plan, and I happened to remember that one of my friends, Dr. Charles Clark,

has charge of the health of the animals in the zoölogical gardens. He is a lover of animals, and he is very fond of boys and girls too. I thought it would be a splendid idea to ask him if he could spare the time to show us about and talk to us a little about the health of the animals. Shall we see if he can? I can telephone to him."

"That would be fun," said James.

"Yes, yes, yes!" cried all the others.

Fortunately Dr. Clark was free, and he very cordially agreed to show Miss Leader and her group through the gardens. In about an hour they were on their way. They planned to have luncheon at the park. Dr. Clark met them at the big entrance gate. Soon they were within sight of the animals.

The boys and girls crowded around Dr. Clark.

"You have probably never heard very much about how necessary it is to keep these wild animals in good health," began Dr. Clark. "Think for just a minute of some of the reasons why we like to look at wild animals. Who has an answer?"

"I think one reason, sir, is that they are strong and graceful and beautiful," said John.

"Quite right, John, but they wouldn't be strong or graceful or beautiful if they were not healthy. We should not care to see them if they showed signs of disease, if their coats were soiled, if their teeth were dirty and decayed, if they were weak or sickly. We must keep them in good health in order to keep them beautiful. Just look at that leopard, for example."



"Oh, isn't he beautiful!" said Marian, as they stopped in front of his cage. "See his bright eyes and his silky coat. It fairly shines in the sun."

Dr. Clark smiled. "Because of a diet lacking in vitamin D civilized people in general have decayed teeth, but animals which select their own food in nature never have decayed teeth. Their good diet may explain why they don't have to use toothbrushes or go to the dentist.

"Wouldn't it be very queer if these animals could talk?" he asked. "They are so healthy and clean themselves that they must wonder why many of the people who come here every day to visit them do not seem concerned about stooping postures, unhealthy complexions, lack of cleanliness, and untidy appearance. But is there any other reason that you can think of for keeping those animals healthy?"

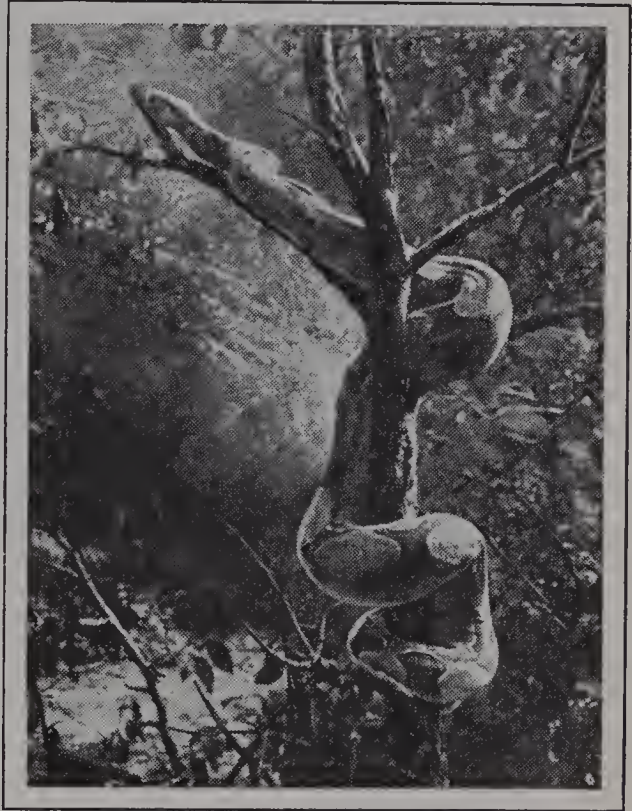
"I think another reason may be that they cost money," said Louise. "Wild animals are hard to get. Once I read a book about hunting wild animals in Africa, Asia, and South America for circuses and parks, and that's how I know. Wouldn't it be a big loss to the city if an elephant or a camel or a lion were to get sick and die? The city must have paid a great deal of money to get them."

"Louise, that's a good answer. At this very moment our zoölogical garden alone has many groups of men in the most out-of-the-way places in the world buying and collecting animals. They go into the forests, swamps, jungles, and burning deserts in their search.

Often they are in danger of catching fevers or of being eaten by the wild animals they are trying to capture or of being killed by hostile savages. Once the animals are secured, it is very hard to bring them from the jungle to America. The animal-hunters and the keepers must know a great deal about the way to keep these animals healthy, or the animals die before they reach this country. All this means, as you can see, that these animals are very costly."

Just at this moment the party paused in front of a big cage of snakes.

"I am sure you couldn't guess how different just the eating habits of the different animals are," said Dr. Clark. "Look at this huge snake. He is called a boa constrictor. See how lazy he looks. That is because he has had his dinner. He is a funny old fellow. He eats only about once in six weeks. He has to have strictly fresh meat. When he has had a good meal, he falls into a kind of half-sleep which continues for weeks until he becomes hungry again. You can understand from this



*A big snake asleep after a meal*

In the zoölogical gardens even the food of snakes must be carefully studied to keep them healthy





*It is against the rules*

Animals are often made sick when fed by the public. Their diet must have the same care as that of children. Why?

example that the food habits of every animal must be studied carefully."

"Look at this sign. It says, 'Please do not feed the animals,'" said Thomas. "But I should think the keepers would be glad to have people feed the animals. It would cost less to keep them."

"But most visitors don't know the right kind of food to give them," said John. "After what Dr. Clark has just told us about the boa constrictor, I shan't dare feed the monkeys and bears again. I don't know what food they need to make them healthy."

"That's right, John," exclaimed Dr. Clark. "Like



us, these animals need certain kinds of food, proper amounts of it, and regular times for feeding. The keepers are especially particular about regular hours for feeding. These hours differ with various animals. Monkeys and bears eat twice a day, lions and leopards eat only once, and so on. Visitors don't know about these things.

"It is unfortunate that, if they have the chance, visitors feed the animals too much candy and cake. These are unnatural foods for animals and, in a sense, for us too. In the wild state these beasts seldom found so much sugar at one time. Now and then bears, because they were protected by such heavy hair, were able to devour large quantities of honey, but not often. The bees could generally defend themselves pretty well when their honey was in danger. As for man, he lived for thousands of years before he discovered how to get sugar from the sap of trees and vegetables.

"I am sure you have learned that the best time for sweets is after a meal, when they will not deaden the appetite and when they can't be enjoyed in large quantities because the food needs of the body have already been taken care of. This is true not only for boys and girls but also for animals. The animal keepers find it just as necessary to be careful to give the zoo animals only small bits of candy and cake at the right time.

"The director of one large zoo says: 'In regard to the feeding of our animals by the general public we feel much as a wise mother does when her young children are fed sweets and other unsuitable foods between

meals by kindly disposed visitors to her home. Formerly we had a great many digestive disorders among the animals as a result of overfeeding by visitors; but since we have regulated each animal's food supply



*A baby gorilla*

Unless those in the monkey family have the right kind of food, they may have decayed teeth

according to his needs, these troubles are now held in check.'"

"Dr. Clark, we learned in our health lessons that we need a number of different elements in our food. Do you need to be careful about these things in feeding the animals?" asked Joseph.

"How clearly your pupils can think, Miss Leader!" said Dr. Clark. "I am glad to answer that question."

They were standing at that moment in front of the monkey cage, watching the monkeys jump, swing, and play all sorts of tricks on one another.

"You all know that rickets in children is caused in part by a lack of certain materials that make strong bones. Once in one of our big city zoos a disease like rickets developed. The monkeys had been fed bread, rice, potatoes, raw peanuts, corn, onions, bananas, and apples in generous quantities. When the zoo doctors looked into the matter, they found that this diet con-

tained too small an amount of protein and fat, about eleven times too much starch, and much too little of the minerals needed to make bones. They made the diet right by reducing the amount of starchy foods and adding fresh whole milk, orange juice, leafy vegetables, and cod-liver oil. You will note that in this way the monkeys got plenty of vitamin C. The disease disappeared.

"I could say a great deal more about the need of studying the food of animals, but one other example will be enough. In a zoo that I know of, costly antelopes died because they were given too many soft vegetables and not enough hay. You can see that proper food is as necessary to bears and snakes and monkeys as it is to you."

"Oh, oh, look at these beautiful birds!" cried Alice.

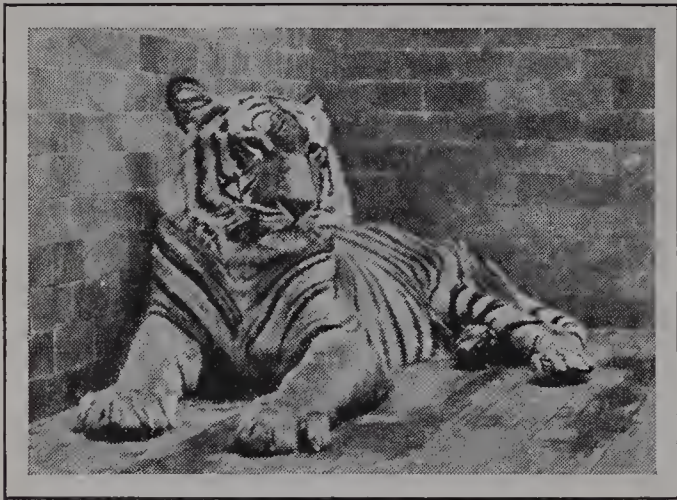
"They are tropical birds," said Ralph. "This sign says that they come from Central America. What beautiful feathers they have! How brilliant their colors are!"

"That reminds me to say that sunlight too is necessary for the health of zoo animals as well as for children. Birds kept in dark, gloomy houses lose their bright colors, but they recover them as soon as the cage is made cheerful and sunny."

"The hippopotamus and her baby are taking a walk," said Alice, as they paused in front of her cage. "How she must want to get back to her own Africa, where she can have plenty of room! Do all the animals take exercise, Dr. Clark?"



"All those that would naturally exercise in their native lands. Flesh-eating animals, like the lion, the tiger, and the sea lion, which use their muscles to obtain food, take a considerable amount of exercise. They often pace about in their cages for hours at a time. Monkeys too, as you have just noticed, like to play



*A tiger resting*

These big cats need sleep and rest as well as people. What else do they need to make them healthy?

on the bars and the swings. Plant-eating animals, like the elk, the giraffe, and the elephant, which do not have to seek far for their food, take less exercise. However, they take sufficient to keep themselves healthy."

"Just look at this tiger," said Ralph.

"He seems to be having a good rest. See how he has his legs stretched out. How comfortable and happy he looks! Do the animals like to rest and sleep, Dr. Clark?"

"Indeed they do," Dr. Clark replied. "Most of them are very fond of resting and, if they are not teased by their mates, will stretch out and sleep even when visitors are present. Of course, sleep and rest are just as important to animals as food."

"The big cats look clean, don't they?" said Miss Leader. "Do all the animals enjoy cleanliness?"

"I am afraid they are not all good housekeepers. In their wild state they do not need to do much housekeeping, because they are always moving about. Animals such as bears, that live in caves, are said to be good housekeepers. The cats, both big and little, spend much of their time sleeking their coats. Even the wild hog is fond of his bath. Some of the animals in the zoo need a little help to keep clean; but nearly all of them, if they are given a chance, will keep themselves fairly clean without being taught."

"I should think that some of these animals would get very homesick," said Edward. "How different living in a cage must be after having the whole jungle to roam around in!"

"They really do get homesick, Edward. Some of them choose companions either of their own kind or of some other kind. A lone lion has been known to make a cage mate of a puppy. Animals suffer from fear. Fright causes considerable body disturbance to animals. Even a cross word will quicken the heart beat of an affectionate pet horse, and experiments show that there is a noticeable change in the blood of a cat after it hears the barking of a dog. You can see how necessary it is to keep the animals from being bullied by their cage mates, teased by visitors, or made unhappy in any way."

"Why is the sheet of glass in front of this cage of big monkeys?" asked Charlotte.

"Those 'big monkeys' are gorillas," said Dr. Clark. "The glass is to keep them from being sick. It is often

put in front of valuable apes. It protects them from our coughing and sneezing. In the wild state these animals seldom have colds, influenza, or tuberculosis; but when they are confined in cages, they get nose and throat troubles easily. If we have a cold when we visit the monkeys, every time we laugh or talk we may give it to them. You see, even in the presence of monkeys it is only right that we should cover our coughs and sneezes."

"Well, after all, Dr. Clark, animals are pretty much like people, aren't they?" said Ruth. "They need proper food and regular feeding, pure air, sunlight, rest, warmth, cleanliness, agreeable company, and freedom from worry and disease."

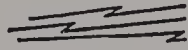
"Yes, Ruth, animals are very much like people. After all, you know, man belongs to the animal kingdom; but when it comes to looking after his health, he doesn't always seem to be far ahead of the animals. That will not be true of you children, because you are trying hard to put into practice the things you are learning about health."



Uncle Wilson has given me a puppy. I promised that I would take good care of him. Just now I am studying

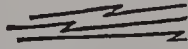


how to feed him and keep him healthy. Dogs need to have their health watched over as much as people do. Can you give me any suggestions? Is milk good for dogs?



*Arthur*

My cat goes outdoors and eats grass. What food elements is he getting that are essential to good health?



*Mary*

I have joined the S.P.C.A. If enough of our class join, we can form a chapter of our own. How many of you will join?

*Tom*

## XXXII

### *With Admiral Byrd at the South Pole*

IT WAS another glorious June morning. The sun rose high above the hills. The birds were singing in the tree tops. The rain the night before had left the trees and the flowers fresh and green. The bright-eyed children who came into Miss Leader's room were beginning to think about the summer vacation.

"Next week, you know, we are to go on our camping trip," said Arthur. "Won't camping be fun? I have learned so much about camp cooking this year that I am anxious to try it. Miss Leader thinks that I have planned some excellent meals."

"Yes, it will be," agreed Alice eagerly, and then her face fell ever so slightly; "but this morning we are to have our last broadcast on health. I am sorry that there aren't going to be any more. What a great year it has been!"

"So am I sorry," said Arthur, "but the broadcast this morning is going to be extra good. It is about Admiral Byrd. I like to hear about him. I have a picture of him hung up in my bedroom. I wonder what the broadcaster can say about health at the south pole. It won't be long before we hear all about it."

Soon Marian's voice was heard announcing:



This is Station HHS. Boys and girls, this is our last broadcast of the year. All the broadcasts have been so interesting that we have looked forward to them from week to week. I'm sure this one will be one of the best. It is about a great American explorer, Admiral Byrd, who carried the American flag to the south pole and to other parts of the Antarctic where no man had ever been before. The success of his expeditions has depended to a very large extent upon the health of his men and of himself. William Glascow, who has done a good deal of reading on Byrd, speaks to you this morning on the subject "With Admiral Byrd at the South Pole." William Glascow.

[*William began:*] Fellow schoolmates, I think that Richard E. Byrd is one of America's great men. He has already had a lifetime of adventure. He has flown across the Atlantic, and he is the only man alive today who has been to both the north pole and the south pole. The latest of his daring adventures was the trip to the south pole.

Anybody who has read about expeditions, or trips, to the cold regions of the Far North or the Far South knows that they call for men who have sound health, great physical strength, and remarkable power to bear pain and hardship. The explorers must face cold, battle with storms, and, no matter how sleepy and tired they are, travel on over the snow and ice to reach their goal. Leaders especially need good health.





Byrd learned early in life about the need of eating the right kind of food. When he was at the Naval Academy at Annapolis, Maryland, he was one of the best athletes among the students. All athletic coaches know that to be a good football or baseball player, or



*Admiral Richard E. Byrd*

He explored the region around the south pole. One reason why he succeeded was because he kept his men in such good health. What did he do for their health?

to do things in track, a boy must have plenty of the best kind of food. So important is food that most colleges today have a training table for their best athletes, where they can get exactly the right sort of food for their needs. Byrd as a student belonged to one of these tables. Your mouth will water when you hear what these boys had to eat for breakfast. Listen: the juice of two oranges, shredded-wheat biscuits, toast and butter, scram-

bled eggs, and all the milk they wanted to drink. The lunch too sounded good. It's so near our own lunch time that I'll make you hungrier than ever by telling you what the boys could have: broth, roast beef, buttered carrots, baked potato, lettuce salad, rolls with butter, and fresh fruit. The dinner was as good as the other meals: cream of spinach soup, roast

lamb, spinach, creamed potatoes, stewed corn, toast and butter, milk, and bread pudding with raisins. Each man at the training table had at least one quart of milk every day. Some of the milk he drank, and some of it was used in his cooked vegetables and deserts. Milk, fruit, and vegetables played a great part in making Byrd's body strong.


When the World War broke out, Byrd went into training to become an aviator and soon became an expert flyer. Just when he had finished his plans for a great fleet of naval planes, the armistice, or truce, was signed and the fighting came to an end.

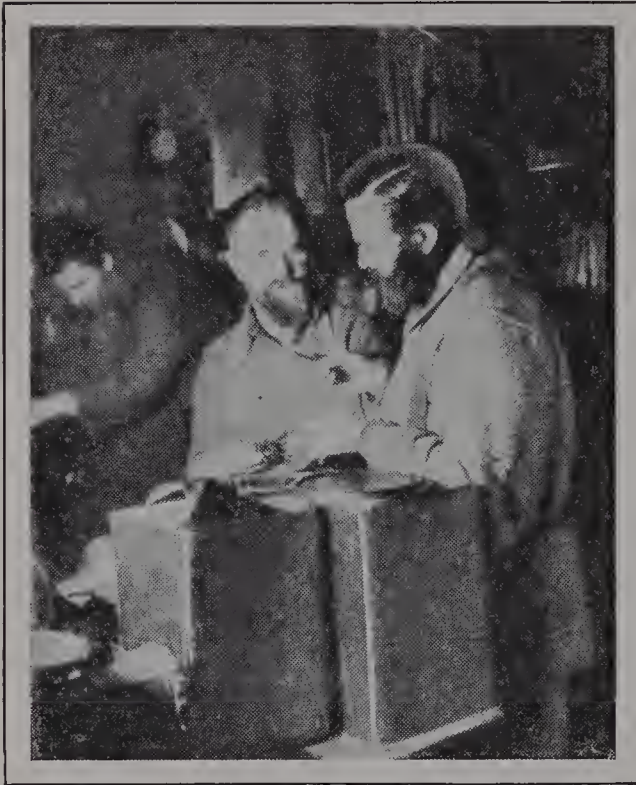
For the next few years Byrd worked on problems dealing with airships, made a trip by airplane across the Atlantic, flew over the north pole, and finally decided to try to reach the south pole and make other explorations in the Antarctic.

This trip to the land of eternal ice and snow was to be long and dangerous. The men would be gone about two years. They would meet the great heat of the tropics and the freezing cold of the Far South. They would have to spend one long antarctic night, six months, in camp before they could begin to explore in the Antarctic. They would have to fight fierce storms and high winds.

One of the first things Byrd had to do was choose his men. This was very important. They must be strong and healthy, for exploring is hard work. They must be men of courage, men who had already faced danger and were not afraid to face more. An explor-



 ing expedition is no place for the man who says "I can't" whenever there is something hard to do. It is the man who always says "I think I can do that. Let me try" who is needed. Finally a band of men.



© Byrd Antarctic Expedition

*Dr. Francis Coman, medical inspector of the Byrd expedition, inspecting tinned food*

Bad food might ruin such a trip

might appear among the men. Admiral Byrd found a very able physician to accompany the party.

It took many months to collect all the supplies needed. Special thought was given to food. The physician was very careful to see that the foods necessary for strength and health were bought. One of the queer kinds of food included was pemmican. A man who

some seventy-five, was chosen. Each one was required to have a thorough physical examination. Special attention was given to their teeth. There was one man that Admiral Byrd was especially eager to get. I think you know who he was. Yes, somebody to keep the men well or to help in case of accident or illness; for somebody might slip into a hole in the ice and break an arm or a leg, or some kind of sickness



uses his muscles hard usually eats four or five pounds of food a day. About half of this weight is water. Pemmican is a dried, greasy kind of meat that has less than three per cent of water in it. Sufficient supplies of ordinary meat would be too bulky for the long sledge journeys, but pemmican just filled the bill. The pemmican which Byrd used was prepared in Copenhagen. It came in blocks of half a pound, wrapped in tinfoil. Such greasy, rich food might not taste good to people who are fussy about food, but on their cold march Byrd's men soon came to look upon it as food fit for the gods.

More than one explorer has found scurvy one of his most dangerous enemies. Scurvy, then, had to be prevented at all costs. A manufacturing company tried out on rats different kinds of foods made from fruits, and finally prepared for Byrd a dried fruit powder containing vitamin C. This they guaranteed to prevent scurvy. Large supplies of lemon powders and crushed-orange juice were included in the stores of food.

Byrd took in all 100 tons of food with him. Think of what had to be loaded! There were 9600 cans of evaporated milk. If you could put one can on top of the other, how high would the pile be? Then 2000 pounds of dried milk went on board. In spite of the care that had to be taken in saving space, plenty of room was made for dairy products, for it is impossible to get fresh milk in the Antarctic. Besides the milk there were 3500 pounds of butter, case after case of raisins, tons of dried vegetables, 1500 pounds





© Byrd Antarctic Expedition

*Dogs in the Antarctic drawing a sled*

The success of this expedition depended largely on the dogs. What did Byrd do to supply them with proper food?

☼ of calves' livers, and several cases of cod-liver oil. I can't name all the foods taken on board, but I have already named enough to show you that they were what doctors call the essential protective foods for good health. Admiral Byrd knew that, no matter how sound his ships might be, how strong his sledges, and how warm his men's clothing, he could not expect to fight cold and hardships without enough good food.

While the expedition was at Dunedin, New Zealand, ready to leave civilization behind, Admiral Byrd found that many of his dogs were sick. This was serious. Not only did he pity the dogs, beautiful creatures, that had been chosen with almost as much care as had the men themselves, but he knew that without them he could not go on. Without dogs his men would not be

able to carry the supplies to the place on shore where the expedition was to spend the winter. They needed the dog teams to establish food depots for use in case of necessity and to help in the scientific study of the region. Unless the dogs could be made to recover from their sickness, the expedition was at a standstill.

It was soon discovered that the dogs were sick because they were not properly fed. Experiments were made; and finally a new kind of dog food was prepared, which had in it beef tallow, meat meal, wheat germ, molasses, and cod-liver oil. To every one thousand pounds of pemmican to be fed to the dogs were added two pints of lemon, which is rich in vitamin C. The new food was given to the dogs at once. They began to get better in a few days and were soon well enough to start south. After the expedition had reached winter quarters, it was easy to supply the dogs with fresh seal and whale meat.

My father has been reading aloud a few pages every night from "Little America," the story of Byrd at the south pole. The family has enjoyed it very much. "Little America" was the name of Byrd's winter camp, or base. When the winter and the darkness came on, snow buried the whole camp except the large radio towers and the air shafts. Under the snow the men prepared for the spring. The camp was so well planned that the cooks had no difficulty in getting to the food storehouse. Each man had fruit juices, vegetables, and what really amounted to at least a pint of milk per day. As you can imagine, the men had





to eat great quantities of meat and fat so as to have energy enough to keep warm.

Did you ever stop to think about the great area of land in the Antarctic? It is as large as the United States and Mexico together. The south pole is about 800 miles from Little America, but Byrd made the round trip by airplane without a stop. Sometimes he had to climb up high enough to clear mountains that were two miles high. In one mountain pass the airplane climbed so slowly that he had to throw 250 pounds of food overboard. Freed of its load, the airplane climbed to a place of safety. It was a great sacrifice, but a forced landing probably would have meant death. Byrd not only reached the south pole, but he and his men also discovered many facts that had not been known before about the silent land of ice and snow and storms.

The American people were very proud of Byrd and his brave men, and gave them a hearty welcome when they landed in New York City.

One most important triumph of the trip was keeping the men healthy. They all returned in excellent condition. It was found that the teeth of the men who returned from the frozen South had far less decay than had those of members of the expedition who had waited in New Zealand.

It is quite clear that the explorer needs health as an ally if he would succeed.



## THE HEALTH BULLETIN BOARD



### *Questions to Think About*

1. Did Byrd's men have a chance to get a balanced ration? Explain.

2. Can you imagine yourself at Little America? What would you have had for breakfast? dinner? supper?

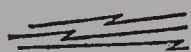
3. How did Admiral Byrd prevent scurvy among his men?

4. Why did he take cod-liver oil along?

5. Can you tell why the teeth of the men who returned with Byrd from the south pole were in better condition than were the teeth of those who waited for him in a civilized country?

6. How were the dogs in the expedition kept healthy?

7. When does spring begin in the Arctic? in the Antarctic? Why do they come at different times?



*Judith Leader*

I listened to a lecture by a young college graduate who sailed across the Atlantic on a forty-foot sailboat. One of the interesting things I heard him say was that he controlled the ripening of the bananas he took along by hanging them in the opposite way from which they grew. If you were to make such a trip, should you take along bananas? Why?

*Doris*

## XXXIII

### *The Health News*

THERE was great excitement in the Abraham Lincoln School. Boys and girls were going to Miss Wise's office and coming out with their arms full of printed papers. Then they were carrying them to the different rooms and handing them out to the children. The children in Miss Leader's room were especially eager to get these papers, on which was printed at the top in large type HEALTH NEWS NUMBER OF THE ABRAHAM LINCOLN HERALD.

To understand what was going on, it is necessary to go back about two months to a day when Miss Wise had happened into Miss Leader's room.

"Oh, Miss Leader," she said, "may I tell the children something, and perhaps ask them a question?"

"Yes, of course, Miss Wise. We are happy to see and hear you."

Miss Wise smiled, as if she were about to say something very pleasant.

"Boys and girls," she said, "we are getting nearer and nearer to the end of the year, and I want to tell you now how much I appreciate your fine work.

"Now, I am going to ask you a question. You know our school paper, the *Abraham Lincoln Herald*. I have



thought that it would be fine to give over the next number to health, and I should like to call that number the Health News Number of the *Abraham Lincoln Herald*. Since you have done especially well in your study and practice of health this year, I decided to ask you to get this number out. This means that you yourselves will write, and collect from other children, articles dealing with health. You could try your hand at writing advertisements too. Our merchants have been advertising for a long time in our school paper. It seems to me that such wide-awake boys and girls as you are might think up some interesting new kinds of advertisement to suggest to them that would please them very much. Should you like to take charge of the Health News Number?"

"Yes, yes!" cried the children, holding their hands high above their heads.

"Miss Wise, don't you think it would be a good plan to write advertisements which would call attention to articles with special health value?"

"Splendid!" said Miss Wise. "I know this Health News Number will be a great success."

How the boys and girls of the Work Together Room had worked since that day! Everybody was doing something. Some were writing health stories. Some were writing health plays. Others wrote advertisements, which they took around to the merchants to look over. You do not wonder, then, that everybody was eager to see the school paper. Let us see what it looks like. Here are the first pages:

## HEALTH NEWS NUMBER OF THE ABRAHAM LINCOLN HERALD

## How Do You Do?

When people meet on the street, they generally salute each other with the words "How do you do?" The usual answer shows that this is really an inquiry about health, for the person addressed often says, "I am well, thank you," or something else that implies that all is well with himself and his family.

The form of salutation, or greeting, in foreign lands is similar. In Germany one person greets another with "Wie geht's?" meaning "How goes it?" The answer usually is "Ganz gut," meaning "Quite well." Frenchmen say, "Comment vous portez-vous?" meaning literally, that is, word for word, "How do you carry yourself?" The answer often is "Je me porte tres bien, merci," meaning "I carry myself very well, thank you." All these expressions mean the same thing. They serve to inquire about one's general health and welfare. If you look up the word salutation itself in the dictionary, you will find that it comes from an old Latin word which means "health." Everywhere the first word of greeting is concerned with health.

Let us look again at the expression "How do you do?" Notice that it asks about your doing. It does not ask, "How much do you know?" or "What do you think?" It asks about your doing. The boys and girls in the Abraham Lincoln School believe that what you do and how you do are the real keys to healthful living. Not that we do not think knowing is worth while. We do, and we have learned this year to know many interesting things about foods and healthful living, but we are proudest of the things we have learned to do. Some of the boys have learned to cook good camp meals. The girls feel very proud that they have been able to help their mothers with the meals. We have all learned how to choose the right kind of lunch in the cafeteria to help us be healthy.

On the following pages you will find some of the advertisements that the children have written. This Health News Number will probably be sent to many of our friends in other schools. We hope they will get out a health paper some day themselves, and that they will have just as much fun doing it as we had.

FISH IS A GROWTH-AND-HEALTH-PRODUCING FOOD

FISH CONTAINS VITAMINS

IS HIGH IN PROTEIN  
CONTENT

HAVE YOU HAD YOUR  
IODINE TODAY?



GET YOUR FRESH FISH AT THE DEEP-SEA MARKET

"O SLEEP, IT IS A GENTLE THING  
BELOVED FROM POLE TO POLE."

ARE YOU AWAKE TO  
THE IMPORTANCE OF SLEEP?

CHOOSE RIGHT SLEEPING  
EQUIPMENT FOR HEALTH!



HINDERED RELAXATION

This cramped position, caused by the sagging, hammock-shaped bed, results in tension on thousands of nerves, and is the greatest cause of unrefreshing sleep.



PERFECT RELAXATION

Here the body rests in its natural curves, because the spring and mattress insure perfect fitting qualities and complete relaxation.

"SLEEP IS LIFE'S NURSE SENT FROM HEAVEN  
TO CREATE US ANEW DAY BY DAY."

THE HOUSEHOLD FURNITURE STORE

for  
"BEDS THAT WILL GIVE YOU REFRESHING SLEEP"



ENJOY A LONG LIFE!

DRINK MILK!

IT IS AS NECESSARY AS FRESH AIR AND SUNSHINE

MILK STRENGTHENS THE BODY  
TO RESIST DISEASE.

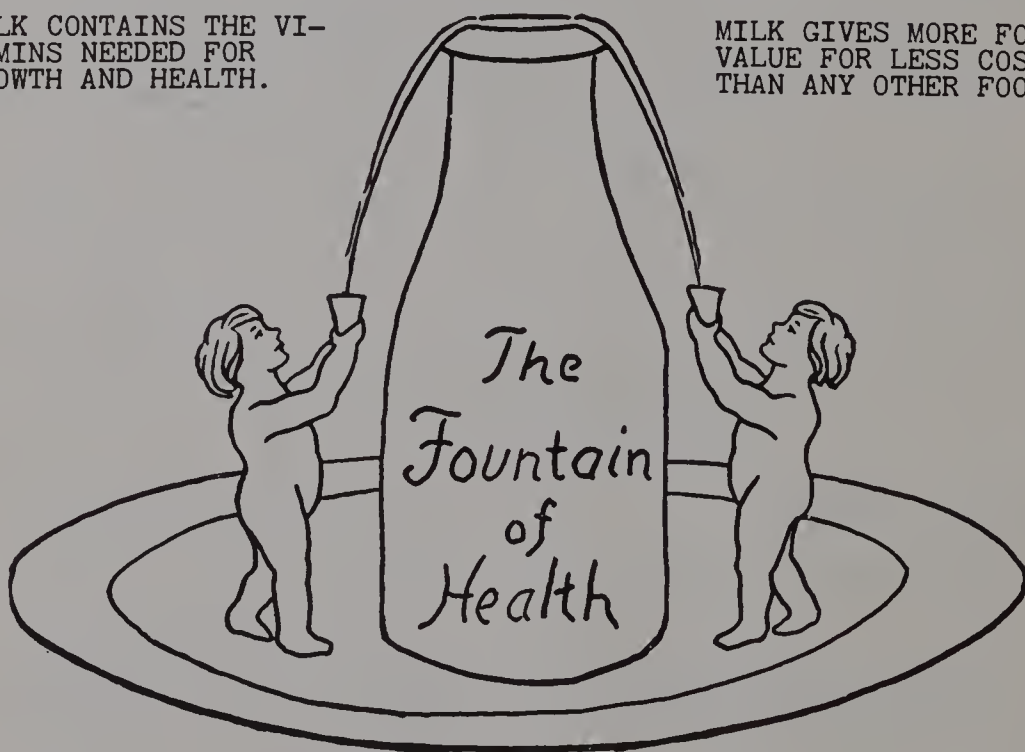
MILK CONTAINS LIME AND PHOS-  
PHORUS, WHICH HELPS TO BUILD  
SOUND TEETH.

MILK CONTAINS THE VI-  
TAMINS NEEDED FOR  
GROWTH AND HEALTH.

MILK HELPS REPAIR THE  
WEAR AND TEAR OF THE  
BODY.

MILK BUILDS STRONG  
BONES.

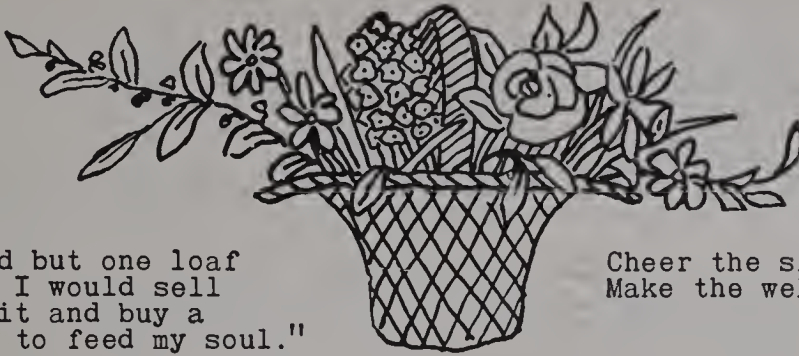
MILK GIVES MORE FOOD  
VALUE FOR LESS COST  
THAN ANY OTHER FOOD.



FOR PURE, RICH MILK

TUBERCULIN-TESTED COWS

BUTTERCUP DAIRY



"If I had but one loaf  
of bread I would sell  
half of it and buy a  
hyacinth to feed my soul."

Cheer the sick.  
Make the well happy.

BUY FLOWERS AT  
BLOSSOM FLOWER SHOP

Buy More Liver, Kidney, Heart, and Brains

These meats are especially  
healthful for growing children.  
Have one of the above at least  
three times a week.



The knowledge that the  
vital organs of beef, pork,  
veal, and lamb contain vita-  
mins was obtained from the  
fact that wild beasts always  
devour the vital organs of  
their prey first.

Fortunately, these meats  
are the least expensive.

Eat more of them if you  
want to keep well and grow  
strong.

BUY THEM AT  
LYONS AND FOX'S

A committee was elected by the school to consider table manners in Chew-Chew Inn. It offers the suggestions below. Let us discuss them soon. Should you change any or add to the list?

1. Enter the lunch room in a peaceful state of mind.

2. Get a tray, and take your place in line. There is plenty of time and food for all.

3. Place a napkin on the tray, and supply yourself with a knife, fork, and spoons.

4. Fill your glass with fresh water.

5. Decide which foods you wish, and then ask for them in a quiet, gentle manner.

6. Select those foods that will serve your body best.

7. Carry your tray to the table where your friends are seated.

8. Engage in cheerful, quiet conversation.

9. Take your time in eating.

10. Take advantage of the full time allowed for luncheon.

11. Drink your soup noiselessly from the side of the spoon.

12. Chew your sandwich quietly.

13. Sip your milk slowly, then place the straw on your tray, together with the empty bottle.

14. Deposit all crumbs on your tray.

15. Deposit fruit skins on your tray.

16. Carry the tray back, in a quiet manner, to the table where soiled dishes are assembled.

17. Wash your hands and, if there is time, take a short walk out of doors.

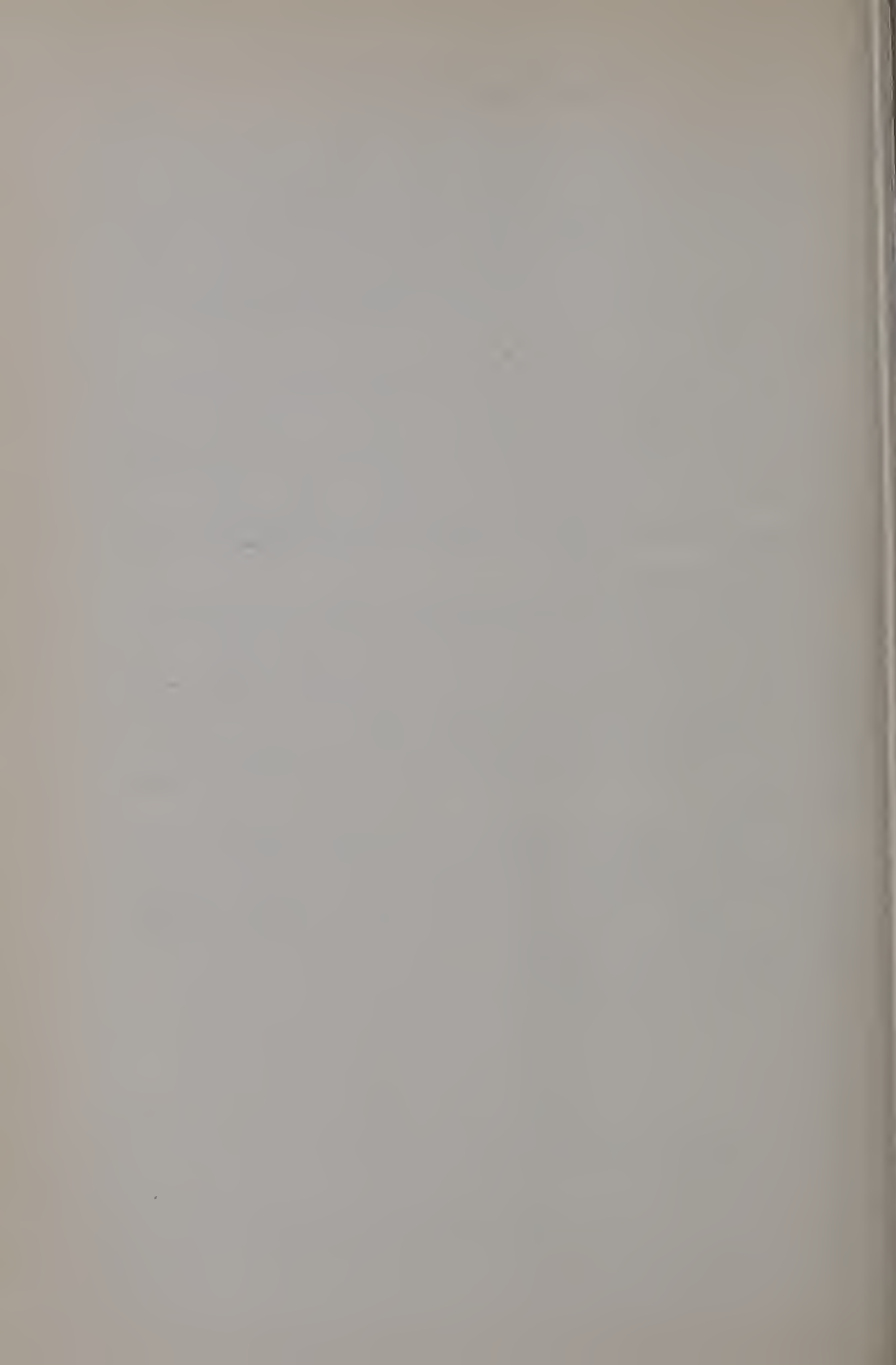


The price of the *Health News* was five cents, and almost every copy was sold. It was bought not only by the boys and girls in the Abraham Lincoln School but also by pupils in many other schools. The profits from selling the *News* were used in buying a new printing press, which they needed very much.

After the *News* appeared, word came from many schools that they were going to have a health paper also, even if they could have no more than a few copies written with a typewriter. In one class they even planned to have just one copy, in which they did all the writing with a pen.

During the last week of school there was an exhibit in Miss Leader's room of all the notebooks — and how clean and neat and beautiful most of them were! Many pupils from other rooms came in to see them. One of the daily newspapers had a long article about the exhibit.

As Miss Leader looked around the room at the notebooks, and into the bright eyes of her happy pupils, she said: "Well, we have all learned to broadcast health, haven't we?"



## APPENDIX

### *Suggestions to the Teacher on Weighing and Measuring*

1. Every pupil should gain in weight and grow in height through the school year.

2. Children should be weighed regularly each month and measured three times per year. Height should be taken in September, February, and June.

3. For weighing and measuring, the American Child Health Association gives the following directions:

Remove outdoor clothing, shoes, coat or sweater.

Take height with a square, consisting of two flat pieces of wood joined at right angles (a chalkbox will serve). Place child in an erect position, with heels and shoulders against the wall or wide board upon which has been marked or pasted an accurate measure.

Be sure the scales are balanced.

Have child stand in center of the scale platform.

Take weight to the nearest half-pound.

Take height to the nearest half-inch.

Take age to the nearest birthday.

4. On page 25 is a sample of a chart for recording height and weight, and also a graph representing the monthly weighings. Every pupil should be guided in keeping similar records.

5. In making the graph the pupil's weight in September should be recorded on the broad black line at the left of the X. The numbers in the blank spaces under "Wgt." should then be arranged in an ascending and descending series. Each month a dot should be put where the weight line crosses the month line. Then connect the dots with straight lines. The slanting line will show the growth. The form on page 25 may be copied by the teacher or pupils.

6. It is the business of the child to grow. A continued loss of weight or failure to gain over two or three months should be brought to the attention of the school physician or to that of the parents, so that they may seek the advice of the family physician.



7. The teacher may aid children in growth by inculcating habits and attitudes of healthful living. Among the factors favorable to growth are long hours of sleep, play and exercise in the open air, and a diet that includes a generous amount of milk, fruit, and vegetables.

8. It is more important to know that a child is gaining than that he or she weighs any particular amount at a certain time.

The teacher should study the individual trends of children.

9. A classroom growth record may be secured from the American Child Health Association, 370 Seventh Avenue, New York City. A record for an individual pupil, similar to the one on page 25, has been prepared by Thomas D. Wood, M. D., and Annette M. Phelan, M. A., and may be ordered through the Bureau of Publications, Teachers College, Columbia University, New York City.

## GLOSSARY

**KEY.** āle, senāte, āt, cāre, āsk, ārm, final, āll; ēve, ēvent, ěnd, hēr, recent; īce, īll, admiral; ōld, ōbey, ōn, fōr, anchor; ūse, ūnite, ūp, fūr, circus, mēnū; fōod, fōot; ĥ as in chop; g as in go; ŋg as in sing; n as in ink; th as in thin; th as in the; oi as in oil; ou as in noun; tŭ as in nature; N (*the French nasalizing n*), nearly like ng in sing; K as in German ich, ach.

**Absorb** (ăb sôrb'): to take up, as a blotter takes up ink.

**Accelerate** (ăk sěl'ēr āt): to go faster.

**Acid** (ăs'īd): a substance with a sour, or biting, taste. Lemon juice is an acid. There are acids in the stomach.

**Acidity** (ă sīd'ī tī): condition of being acid; as, lemon juice has acidity.

**Adenoids** (ăd'ē noidz): a growth in the passage between the nose and the throat.

**Adjust:** to make fit; as, the catcher adjusted his mask.

**À la carte** (à là kărt'): (of a meal in a restaurant) ordered dish by dish from a card or bill of fare.

**Alcohol:** (ăl'kô hōl): a colorless liquid formed by fermenting starch or sugar. Wine and beer contain alcohol.

**Alcoholic liquors:** beverages which contain alcohol.

**Alfalfa** (ăl făl'fă): a plant whose stem and leaves make good hay for cattle and horses. Alfalfa belongs to the legume family of plants.

**Alkali** (ăl'kă lī): a substance which is the opposite of an acid. An alkali has a soapy taste. Bicarbonate of soda is an alkali.

**Alkaline:** like an alkali.

**Allied** (ă līd'): pears and apples are said to be allied, as they are somewhat alike.

**Ammonia** (ă mō'nī ă) **machine:** a machine using the gas ammonia to produce cold temperatures.

**Anemia** (a nē'mīa): a condition of the body in which the blood is of poor quality.

**Anemic** (a nē'mīk): suffering from anemia.

**Annual**: yearly.

**Apparatus** (ăp a rā'tus): machinery for doing a certain piece of work.

**Appetizer** (ăp'ē tīz ēr): something which will create an appetite.

**Appetizing food**: food which is attractive.

**Arsenate of lead** (ăr'sē nāt): a substance containing arsenic and used as a poison spray to kill certain insects.

**Arsenic** (ăr'sē nīk): a poisonous substance.

**Artificial** (ăr tī fīsh'al): the opposite of natural; as, artificial flowers.

**Bacteria** (băk tē'rī a): very small plants that cannot be seen without the help of a microscope.

**Beetle**: an insect with a hard-shelled back. Ladybugs are beetles.

**Beriberi** (bēr'ī bēr'ī): a disease caused by the lack of a balanced diet.

**Beverage** (bēv'ēr āj): a drink.

**Bile**: a liquid which is made by the liver. Bile helps to digest fats.

**Biology** (bī ōl'ō jī): the science or study of all plant and animal life.

**Blanch**: to make white or pale.

**Blood vessel**: any tube which carries blood in the body.

**Boa (bō'a) constrictor**: a snake which kills its prey by crushing with its coils.

**Boll weevil** (bōl wē'vl): a beetle which lives on cotton plants. The larvæ of the boll weevil do great damage to the pods, or bolls, of ripening cotton.

**Botany**: the study of plants.

**Brain**: the soft nerve tissue in the skull.



- Bran:** the outer covering of a seed. The bran coat is removed from wheat kernels before white flour is made.
- Brazil (bra zĩl) nut:** an oily nut from Brazil.
- Breed:** to raise cattle and horses.
- Broccoli (brŏk'ŏ lĩ):** a variety of cauliflower.
- Broil:** to cook directly over a fire.
- Broom corn:** a kind of corn whose stems are used in making brooms.
- Brussels sprouts:** a variety of cabbage.
- Bulb:** a bud which can grow underground. Bulbs have thick leaves in which food is stored.
- Buoy (boi):** an object floating in water and used to mark a particular place.
- Burning glass:** *see* Lens.
- Butternut:** a tree of the walnut family.
- 
- Calcium (kăl'sĩ um):** a mineral found in lime. This mineral is used in the body for making bones and teeth.
- Calorie (kăl'ŏ rĩ):** a measure of heat, as the dollar is a measure of money. The energy-giving or strength-giving material in foods may be measured by the calories of heat given when the food is burned.
- Canine tooth:** a pointed tooth next to the incisors.
- Carbohydrate (kär bŏ hĩ'drāt) food:** starches and sugars are carbohydrate foods. Part of the fuel for the body is furnished by carbohydrate foods.
- Carbon dioxide (kär bŏn dī ŏk'sīd):** a colorless gas. Plants use carbon dioxide to manufacture sugars and starches. Animals breathe out carbon dioxide at each breath.
- Carotin (kär'ŏ tĩn):** the yellow coloring material in carrots.
- Caterpillar:** *see* Larva.
- Cell:** everything which lives is made of cells. These cells are too small to be seen without a microscope; but they are the parts which make every leaf or muscle, as a table may be made from pieces of wood or as some walls are made of brick.

**Cellulose** (sěł'ũ lōs): paper, cotton, and the solid part of plants are mostly cellulose. Cellulose in food is called roughage.

**Centrifuge** (sěň'třĩ fũj): a machine which can whirl a substance around at a high rate of speed.

**Cereal**: food made from grain, as wheat or corn.

**Charcoal**: wood which has been partly burned, or charred.

**Chef** (shěf): chief cook.

**Chinch bug**: an insect which can puncture a stem with its beak and suck the sap, thus killing certain plants, as grain.

**Chlorophyll** (klō'rō fĩl): the green coloring material of plants.

**Churn**: to stir cream in such a way that butter will be made.

**Circulate** (sũr'kũ lāt): to travel or move so that a return is made to the starting place; as, the blood circulates in the body.

**Citrus** (sĩt'rys) **fruit**: the orange, lemon, and grapefruit are citrus fruits.

**Clot**: the blood clots, becomes solid, when exposed to the air.

**Cockroach**: an insect related to the grasshopper. Its body is flat, and it is active in the dark.

**Codling moth**: a moth whose caterpillar attacks apples while they are on the trees.

**Cold storage**: storage of food in such a cold place that the food will not spoil.

**Condensed milk**: in making condensed milk, sugar is added before heating, and about half the water is evaporated.

**Condiment** (kõň'dĩ męnt): a seasoning for food.

**Contagious** (kõn tã'jus) **disease**: any disease which may be carried from person to person by touch.

**Corn-borer**: an insect which lives upon the corn plant.

**Corpuscle** (kõr'pũsl): a cell that flows in the blood. Some corpuscles are red, some are white.

**Corral** (kõ rãl'): a yard in which animals may be kept.

**Cricket**: a jumping insect which utters chirping notes.

**Cubic centimeter** (sě̌n'tĩ mē tē̌r): a measure of volume. A teaspoon holds 4 cubic centimeters.

**Cultivate**: to cause to grow and to care for; as, a farmer cultivates the crops in his fields.

**Curculio** (kûr kû'ľĩ ō): a kind of beetle.

**Curd**: the thickened substance formed in milk when it sours.

**Cylinder** (sĩľ'ĩn dē̌r): fruit and vegetables are often canned in tins which have the shape of a cylinder.

**Dairy products**: food articles made from milk.

**Decomposition**: decay, rot.

**Dentine** (dē̌n'tĩn): a substance like bone; it forms the greater part of the teeth, underneath the enamel.

**Destination** (dēs tĩ nā'shũn): the place chosen for the end of a journey.

**Diet**: food eaten regularly.

**Digestible**: material which can be digested.

**Digestion**: the change of food materials into substances that the body can use.

**Digestive juices**: liquids, made in the body, which aid digestion.

**Diphtheria** (dĩľ thē'rĩ ă): a germ disease.

**Disease**: sickness.

**Dissolve**: salt, sugar, and many other substances dissolve in a liquid.

**Domesticate** (dō mēs'tĩ kāt): to make tame.

**Draft**: a strong breeze.

**Drought** (drout): lack of rain or water.

**Drug**: a substance which may be used as a medicine.

**Drug habit**: the use of a drug so often that an appetite for the drug is formed. This desire for the drug may be stronger than the desire for food.

**Duct**: an opening or tube.

**Dye**: a stain which can color various materials.



**Electric refrigerator:** a refrigerator controlled by electricity.

**Element, food:** a necessary food substance, as protein or any of the vitamins.

**Elixir** (ě lĭk'sěr) : something which was supposed to give life.

**Ember:** a lighted coal.

**Enamel, tooth:** the very hard outside covering of the teeth.

**Endive** (ě'n'dĭv) : a plant something like lettuce, used in salads.

**Energy:** strength; power.

**Enrichment of soil:** adding substances to soil so that it will produce good crops.

**Entomological** (ě'n tō mō lōj'ĭ kəl) **Department:** a part of the government; it studies about insects, to control and use them for the benefit of the citizens.

**Epidemic** (ěp ĭ dēm'ĭk) : a disease which attacks many people at the same time.

**Epiglottis** (ěp ĭ glōt'ĭs) : the hard tissue or cover in the back of the mouth; it prevents food from going down the windpipe.

**Escarole** (ěs kà rōl') : a vegetable somewhat like lettuce, used in salads.

**Esophagus** (ě sōf'ə gŭs) : the food tube which leads from the mouth to the stomach.

**Ethylene** (ěth'ĭ lēn) : a kind of gas.

**Evaporate:** to change from a liquid to a gas; as, water evaporates and disappears into the air.

**Evaporated milk:** milk from which a great deal of the water has been evaporated by heating.

**Excess:** too great an amount.

**Experiment:** a trial made to learn more about something.

**Fahrenheit** (fä'ren hīt) **thermometer** (*abbr.* F.) : a thermometer named for its inventor, Fahrenheit; on it the boiling point of water is 212° and the freezing point 32°.

**Fennel:** a plant somewhat like celery.

**Ferment** (fě̃r mĕnt') : to change by the action of bacteria ; as, sweet milk may ferment into sour milk.

**Fertilize (soil)** : to cause to become more productive, able to grow better crops.

**Fertilizer** : a substance which will help a soil to produce better crops.

**Fiber** : a strong, tough part of a plant. Cotton cloth is made of cotton fibers woven together.

**Filter** : to clean by passing through certain materials. Fine sand may be used as a filter for dirty water.

**Focus** (fō'kʌs) : to bring to a point as a burning glass brings to a point the rays of the sun which pass through it.

**Fog** : small particles of water vapor which may be seen in the air near the ground.

**Foliage** (fō'li āj) : young stems, leaves, and flowers of trees and other plants.

**Food model** : material arranged and colored to look like real food.

**Friction-chemical** (frīk'shun-kĕm'ī kəl) **match** : a match which is tipped with substances that take fire when they are rubbed. The burning chemicals set fire to the match stick.

**Fuel** : anything which will burn.

**Fuel foods** : foods which will be used in the body to give heat and energy.

**Fume** : a smoke or odor.

**Garlic** : an onion-like plant with a strong odor.

**Garnish** : something placed on a dish of food for ornament or flavor or relish.

**Gas** : a material which spreads out to fill the space around it. Air and steam are gases.

**Gasoline** : a liquid which can be used to produce heat and power.

**Gastric juice** : the juice of the stomach ; it helps digestion.

**Germ of the grain:** the part of the seed which will begin to grow if proper amounts of air, water, and sunshine are supplied.

**Gizzard** (gĭz'ard): a kind of stomach which can grind foods. Birds have gizzards.

**Gland:** an organ of the body which produces a liquid. The liver is a gland.

**Glass prism:** a three-sided piece of glass which can break up white light into the rainbow colors.

**Goiter:** an enlargement of a gland in the neck.

**Grain:** the seeds of various food plants, as wheat or rice.

**Graph** (gráf): a design made to show changes in height, weight, or other things.

**Greens:** green leafy vegetables prepared for food by boiling.

**Grub:** *see* Larva.

**Gypsy moth:** a moth whose caterpillar damages trees.

**Habitual** (hə bĭt'ŭ əl): like a habit, customary.

**Half-breed:** a person whose parents were not members of the same race.

**Handicap:** a disadvantage.

**Hibernate** (hĭ'bĕr nāt): to spend the winter in a sleeping or resting condition.

**Hospital steward** (stŭ'ĕrd): a waiter and helper in a hospital.

**Husk:** the outer covering of seeds or fruit.

**Hygiene:** the study of good health, — how it may be secured and kept.

**Incisor** (ĭn sĭ'zĕr): a cutting tooth. There are four incisors in each normal human jaw.

**Indigestible** (ĭn dĭ jĕs'tĭ bl): that which cannot be digested.

**Infect:** a wound may become infected by something which will produce disease.

**Infectious** (ĭn fĕk'shŭs): catching.



**Inflame:** when part of the body becomes inflamed, there is usually pain and swelling. The inflamed region may be red.

**Influenza** (ĩn flōō ěn'zā): an infectious disease much like a cold.

**Insect:** an insect is an animal whose body has three parts. Insects have six legs. Ants, grasshoppers, and ladybugs are insects.

**Insecticide** (ĩn sĕk'tĩ sĩd): a substance which will kill insects. A poison for one insect may not be a poison for another.

**Instrument:** a small machine made for a certain purpose.

**Insurance policy** (ĩn shōōr'āns pōl'ĩ sĩ): an agreement to pay a certain sum of money in case of losses or accidents.

**Intestinal** (ĩn tĕs'tĩ nāl) **juice:** a liquid made in the walls of the intestines to help digest food.

**Intestine:** the long, narrow tube through which the food passes after leaving the stomach, and in which further digestion takes place. In adults the intestine is about 25 feet long.

**Iodine** (ĩ'ō dĩn): a necessary food element. Seaweeds contain much iodine.

**Iron:** a necessary food element. Iron is found in many rocks, soils, and plants, as well as in eggs and the organs of animals.

**Iron ore:** rock which contains a great deal of iron.

**Irrigate:** to supply soil with water for growing crops. The water is often stored in reservoirs and brought to the land through ditches.

**Itch:** irritated condition of the skin.

**Joint:** a union of two moving parts, as two bones.

**Kale:** a plant with curled leaves, somewhat like cabbage.

**Kernel:** the seed of a cereal, as of oats or corn.

**Kidney:** a gland which produces a waste liquid.

**Kohlrabi** (kōl'rā bĩ): a kind of cabbage whose stem is eaten.

**Ladybug:** a bright-colored beetle.

**Larva** (*plural, larvæ*) (lär'və, lär'vē). The life of many insects may be divided into four parts. During the second part the insect is something like a worm. It may be called a grub or caterpillar at this time, but is more properly called a larva.

**Leafy vegetable:** a vegetable whose leaves are eaten rather than the roots; for example, lettuce, spinach, and cabbage.

**Leeuwenhoek** (lā'ven hōók), **Anton van:** a Dutch lens-maker who was the first to see bacteria with the aid of a magnifying glass.

**Legume** (lēg'ūm). Peas, beans, lentils, clover, and alfalfa are members of the legume family. The legumes are able to enrich soil in which they grow.

**Lens** (lēnz): a piece of glass which bends rays of light when they pass through it.

**Lentil:** a legume whose seeds are eaten.

**Lime:** a white, earthy material. Some soils are improved by small amounts of lime.

**Liquid:** a material which flows easily. Water, sirups, and oil are liquids.

**Liquor:** a beverage containing alcohol.

**Liver:** a large gland which helps digestion in several ways.

**Lobster:** a sea animal with two large claws or pincers, often used for food.

**Locality** (lō kăl'ī tī): a region or place.

**Locust:** an insect related to the grasshopper.

**Mammoth** (măm'oth): a large animal somewhat like an elephant. There are no living mammoths today.

**Marathon** (măr'a thōn) **race:** a running race, usually about 25 miles long.

**Market:** a place where foods may be bought and sold.

**Masticate** (măs'tī kāt): to chew.

**Medicine:** a material which is a remedy for a disease.

**Mediterranean** (mĕd ĭ tĕr ā'nĕ ʌn) **fruit fly**: an insect which harms fruit.

**Membrane** (mĕm'brān): a soft, living tissue that forms a covering or skin. The skin is a membrane, and so is the lining of the stomach and intestines.

**Menu**: a list of foods which may be served at a meal.

**Metal**. Copper, iron, and gold are metals.

**Microorganisms** (mī krō ôr'gʌn ĭzmz): living objects so small that they can be seen only with the aid of a microscope.

**Microscope**: an instrument which enlarges very small objects so that they may be seen.

**Microscopic** (mī krō skōp'ĭk): something which can be seen only with the help of a microscope.

**Mind**: the controlling part of the body.

**Mineral**: a material which is not animal or vegetable.

**Mineral salts**: substances which may be formed by the joining of acids and alkalis. Mineral salts are found in some foods.

**Molars** (mō'lʌrz): the teeth used for grinding food.

**Mold**: a very small plant. Molds usually harm the materials on which they grow.

**Moth**: an insect much like a butterfly. Moths usually fly by night.

**Muscle**: an organ of the body which can produce movement.  
We smile, walk, and move our eyes by the help of muscles.

**Native**. A plant or animal which has always lived in a certain region is said to be a native of that region.

**Nicotine** (nĭk'ō tĭn): a drug found in tobacco.

**Nitrogen** (nī'trō jĕn): one of the gases in the air. Nitrogen combined with other substances is used for food by plants.

**Nourishment**: strength given by food.

**Numb** (nŭm): without feeling.

**Nutrient** (nŭ'trĭ mĕnt): food which nourishes, or gives strength.



**Nutrition** (nũ trĩ'shun) : taking in and using food substances.

**Nutritious** (nũ trĩ'shus) : body-building and strength-giving.

**Nutritive** (nũ'trĩ tĩv) : strength-giving.

**Opium** (õ'pĩ um) : a drug made from a kind of poppy.

**Oral hygienist** (hĩ'jĩ ɛn ĩst) : one who can care for the health of the mouth.

**Organism** (õr'gan ĩzm) : a living object, as a plant or a dog.

**Organs of digestion** : the parts of the body which help to digest the food.

**Out-of-season** : watermelon eaten at Christmas would be out-of-season.

**Oxygen** (õk'sĩ jɛn) : one of the gases which make up the air.

Oxygen is needed by all plants and animals.

**Pancreas** (păn'krẽ ɔs) : a gland near the stomach ; it makes pancreatic juice.

**Pancreatic** (păn krẽ ăt'ĩk) **juice** : a juice which aids the digestion of food.

**Paraffin** : a waxy substance often used to cover preserves.

**Paralyze** (păr'a lĩz) : to destroy the power of motion.

**Parotid** (pə rõt'ĩd) : a salivary gland near the ear.

**Pasteurize** (pàs'těr ĩz) : to destroy the bacteria in a liquid.

**Patent medicines** : a combination of drugs and materials which is patented is called a patent medicine.

**Pear-tree psylla** (sĩl'a) : a jumping insect related to plant lice.

**Pecan** (pě kăn') **nut** : a nut from a pecan tree, which is related to the hickory tree.

**Pellagra** (pě lăg'ra) : a skin disease.

**Pemmican** (pěm'ĩ kɔn) : a food made of pounded dried meat mixed with fat.

**Perspiration** : sweat, or the moisture produced by the sweat glands of the skin.

**Perspire** : to sweat.

**Pest:** that which causes trouble, as an insect pest or a plant pest.

**Phosphorus** (fös'for us): a mineral needed by the body in small amounts to build tissue and bone. In large amounts it is a poison.

**Physician** (fĩ zĩsh'ḁn): a doctor of medicine.

**Pith:** the soft center of the stem of many plants.

**Plantain** (plăn'tăn): a kind of banana. The plantain is larger but less sweet than the banana.

**Pneumonia** (nũ mō'nĩ ḁ): a disease of the lungs.

**Poison:** a substance which destroys health.

**Poison spray:** a liquid used as a spray, usually to kill insects.

**Pore:** a very small opening. We perspire through pores in our skin.

**Port of entry:** a city where imports from foreign countries may enter a country.

**Potassium** (pỗ tấs'ĩ um): a mineral necessary for building tissue in both plant and animal life.

**Potato beetle:** a hard-shelled insect which feeds upon potato vines.

**Preheater:** a kind of heating machine.

**Preripening:** the ripening of fruits by artificial means. Often fruit is picked while green and made to ripen by certain treatment while on the way to market.

**Preservation** (prěz ěr vā'shun): the protection of food or perishable material.

**Preservative** (prē zũr'vḁ tĩv): a substance used to prevent the decay of food.

**Process** (prỗ'ěs): several acts or movements which follow each other in regular order.

**Protective food:** a food which not only gives warmth and energy and provides for growth but also protects the body against disease.

**Protein** (prō'tě ĩn) food: a food, such as meat, used by the body to build tissue.

**Protoplasm** (prō'tō plāzm): the living material of a cell.

**Pulp cavity**: the inner part of the tooth, through which the tooth is nourished by blood vessels.

**Pulverizing machine**: a machine which can grind material into fine bits.

**Pylorus** (pī lō'rū): the opening from the stomach into the intestine.

**Quince** (kwīns): a fruit related to the apple.

**Rancid**. A fat which has decayed is said to be rancid.

**Ration** (rā'shun): a measured amount of food.

**Recipe** (rēs'ī pē): a set of instructions for making a kind of food or medicine.

**Refrigeration**: artificial cooling.

**Refuse** (rēf'ūs): waste material.

**Regulate**: to control; as, a switch regulates the use of electricity.

**Rennet**: a substance which will cause milk to curdle.

**Reserve** (rē sērv'): to store or save for future use.

**Revolving**: turning or spinning; as, a revolving top.

**Rickets**: a disease of childhood in which the bones are not properly formed.

**Roughage** (rūf'āj): bulky food, as lettuce and apples.

**Sac**: an organ shaped like a bag, often containing a fluid.

**Salad dressing**: any oily liquid used on salads to make them more attractive, tasty, or digestible.

**Saliva** (sā lī'vā): the fluid emptied into the mouth by the salivary (sāl'ī vā rī) glands.

**Salt brine**: water containing a large amount of dissolved salt.

**Sap**: the liquid part of plants.

**Scale**: an instrument for weighing.

**Scavenger** (skāv'ēn jēr): an animal that will eat or destroy refuse.

**Science** (sī'ens): knowledge.



**Scientist** (sī'en tīst) : a person who tries to add more knowledge to the world by studying and experimenting.

**Scurvy** : a disease caused by the lack of foods containing vitamin C.

**Secrete** (sě crēt') : to give off a liquid by a gland.

**Shed** : to give off ; as, a snake sheds its skin.

**Solution** (sǒ lū'shun) : a liquid in which something has been dissolved ; as, a solution of salt and water.

**Spice** (spīs) : a vegetable condiment used for flavoring food, as pepper or ginger.

**Spore**. Some plants produce spores instead of seeds. From the spores more plants will grow.

**Squash-borer** : a boring insect which attacks squash plants.

**Stagnant** (stăg'nant) **water** : water which has stood for a long time without moving.

**Steam**. When water is heated to 212° F., it changes to a gas called steam.

**Sterile** (stěr'īl) : free from germs.

**Sterilization** (stěr īl ī zā'shun) : the killing of all germs.

**Sterilize** (stěr'ī līz) : to kill germs.

**Stimulant** (stīm'ŭ lant) : something which will excite.

**Sublingual** (sŭb līn gwāl) : under the tongue.

**Submaxillary** (sŭb māk'sī lă rī) : near the lower edge of the lower jawbone.

**Substance** (sŭb'stans) : material of which a thing is made.

**Sugar cane** : a plant grown for the sugar which can be secured from its sap.

**Sulfur** (sŭl'fur) : a yellow material. Some sulfur is found in the yolk of eggs. It is used in medicine.

**Superstition** (sū pěr stīsh'un) : a belief which is not based on knowledge.

**Sweetbreads** : certain glands of cattle when used as meat.

**Table d'hôte** (tă'bl dōt) : a meal in a restaurant at a fixed price.

**Tallow candle:** a candle made of suet or fat from cattle.

**Tangerine** (tǎn'jěr ēn): a citrus fruit something like the orange.

**Tanning:** the process of changing a skin to leather.

**Tapioca** (tǎp ĭ ō'kə): a starchy food made from the roots of certain tropical plants.

**Tartar:** a crust which forms on neglected teeth.

**Tenement:** a building in which many families live.

**Thermos bottle:** a bottle so built as to hold the temperature of its contents a long time.

**Thyroid** (thī'roid): a gland in the neck.

**Tinder:** something which will catch fire quickly.

**Tissue:** a group of cells, all of which can act in the same way.

The muscle tissues give movement; the skin is a tissue which protects the body; and the walls of the stomach are lined with many tissues.

**Tomato worm:** the wormlike caterpillar which attacks tomato vines.

**Tone.** When an organ or the entire body is in a healthy condition, it is said to be in tone.

**Tonic:** a kind of medicine or drug supposed to aid the appetite or the well-being of the body.

**Trachea** (trā'kě ə): the windpipe going from the nose and mouth to the lungs.

**Transplant:** to remove flowers, bushes, and even trees and plant them again.

**Tuber:** an enlarged underground stem, as the potato.

**Tuberculosis** (tū běr kŭ lō'sĭs): a contagious disease often occurring in the lungs.

**Typhoid** (tī'foïd) **fever:** a contagious disease. The germs are usually spread in food and drinking water.

**Ultra-violet rays:** rays of light which cannot be seen, but whose presence can be told in other ways.

**Vegetarian:** one who eats no flesh, living on vegetable foods.

**Vitamin** (vī'ta mĭn): a necessary food element. There are several kinds of vitamins.

**Watt:** a unit used in measuring electricity.

**Weather forecast:** a statement made about the probable condition of the weather twenty-four or forty-eight hours in advance.

**Weevil:** a kind of beetle.

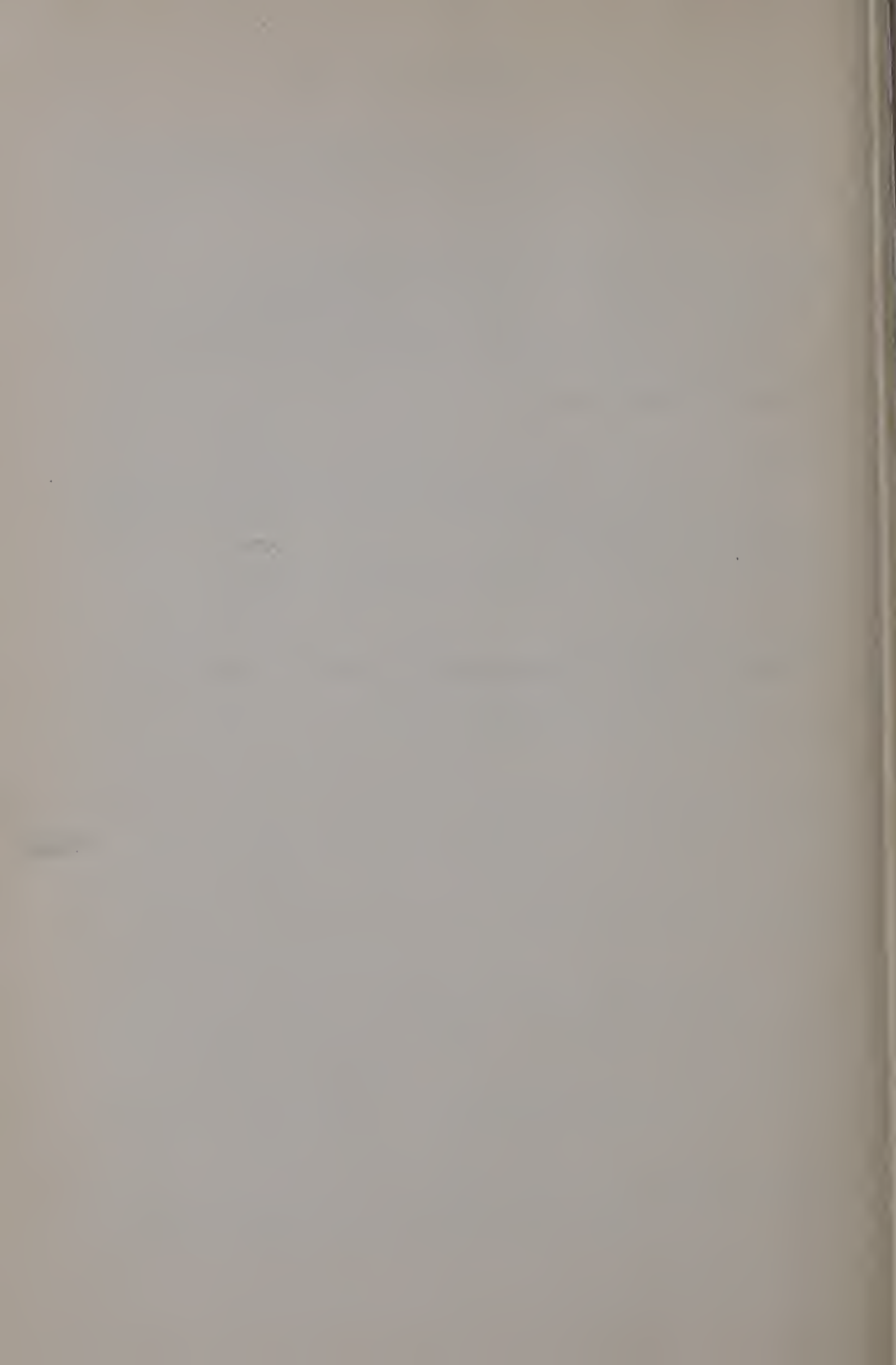
**Yeast.** A cake of yeast contains many yeast plants. A single yeast plant is so small that it may be seen only with the help of a microscope.

**Yolk:** the yellow food material found in an egg.

**Zinc:** a bluish metal.

**Zoölogical** (zō ō löj'ĭ kəl) **garden:** a large space, often in a park, in which wild animals are kept.





## INDEX

- Acids in foods, 190  
Adenoids, 68  
Agricultural colleges, 338-339  
Agricultural department, 339  
Air, importance to life, 67-69;  
    how used in body, 68, 77; need  
    of exercise in open, 69  
Alcohol, not a true food, 251;  
    contains poison, 252; will not  
    help fight disease, 254; does  
    not bring success, 254; facts  
    to remember about, 255; habit  
    hard to break, 256  
Alkaline salts in vegetables, 189-  
    190  
Anemia, how caused, 76; foods  
    containing iron a remedy for,  
    78  
Animals, depend on plants for  
    food, 18; and food in winter,  
    23; and good teeth, 344; feed-  
    ing proper food to, 344-349;  
    sunlight necessary for, 349;  
    need exercise, 349-350; sleep  
    and rest, 350; cleanliness of,  
    350-351; suffer from loneliness,  
    fear, etc., 351; in captivity  
    easily catch colds and other dis-  
    eases, 352; very much like  
    people, 352  
Appalachian Mountain Club, 46  
Appetite not a safe guide in choos-  
    ing food, 55-56; sharpened by  
    exercise in open air, 69, 252,  
    255  
Bacteria, on plants, 190; spoil  
    foods, 281, 283, 284; some help-  
    ful, 283-284; cause diseases,  
    284; conditions for growth of,  
    284  
Balanced diet, 244, 269  
Bathing in salt water, 122  
Beaumont, Dr. William, 145, 146  
Beriberi, 96-100  
Bile, 147  
Bile duct, 149  
Blood, work of, 64; water in,  
    64; absorbs oxygen from air  
    we breathe, 68; red corpuscles  
    in, 76-77; iron needed in, 76-  
    77; needs to be alkaline, 200  
Blood vessels, 77  
Bones, watery fluid in joints of,  
    63; need calcium, 73; phos-  
    phorus needed by, 76  
Bowlegs, how caused, 73, 114, 134  
Bran, 170  
Bread, 168; important food, 171-  
    172; white and whole-wheat,  
    172-173; yeast used in mak-  
    ing, 281-282; mold spoils, 282-  
    283  
Breath, moisture in, 66  
Breathing, necessity of, 67, 68;  
    adenoids interfere with, 68-69  
Broadcasting health, 9; first  
    broadcast, 13; tuning in for  
    first broadcast, 15  
Buffalo once plentiful on West-  
    ern plains, 223, 224

- Burbank, Luther, 326
- Butter, how discovered, 156; important food, 157; used in ancient times, 158
- Byrd, Admiral, at south pole, 108, 354-362
- Cafeteria, cleanliness and attractiveness in school, 1-3; paying for, 4-5
- Calcium, needed by bones, 73, 115, 134; needed by teeth, 74-75, 115, 134; foods that contain, 75, 134, 161, 170, 189, 218, 230; helps to stop bleeding, 76
- Calorie, unit of measuring heat produced by food, 33, 42; definition of, 40
- Calories, needed by children, 33; needed by various people, 33; counting, 33-34, 41-42; in different foods, 34, 38-39; importance in gaining or losing weight, 42
- Camp cooking, 303
- Candy, and energy, 46, 234-235; compared with fruit as food, 236-240; an appetite destroyer, 240, 252
- Canine teeth, 131
- Canning food, 286
- Carbohydrates (sugars and starches), mostly from plants, 42-48, 68; in milk, 160; in grains, 169; rice rich in, 173; vegetables contain, 187-188; food fruit contains, 199; in nuts, 218
- Carbon dioxide, raises dough, 281-282; plants take from air, 328, 329
- Carotin and vitamin A, 92-93
- Cells, grow by dividing, 327; protoplasm in, 327
- Cellulose, value of, in diet, 84-86; vegetables contain, 188; fruits contain, 199
- Cereals, large per cent of world's food supply, 169; nutrition contained in, 169; easily digested, 171; some important, 171-176
- Chayote, 93
- Cheerfulness aids digestion, 150, 151
- Cheese, contains calcium, 75; contains phosphorus, 76; rich in protein, fat, minerals, and vitamins, 158; how discovered, 158; a popular food, 158-159
- Chew-Chew Inn, 4, 7
- Chlorophyll, 329
- Citrus fruits, 198-199
- Cleanliness of animals, 350-351
- Cod-liver oil, contains vitamin D, 73, 116, 120; contains vitamin A, 91
- Coffee and tea, have no value as foods, 262; contain small amount of drugs, 262; children should drink milk instead of, 262; moderate use of, by grown-ups, 263
- Cold as preservative of food, 287-289
- Colds, when increase and decrease, 91
- Columbus, and spice trade with Far East, 6, 8; seeks route to Far East and discovers America, 8
- Condensed milk, 292
- Condiments, 264



- Constantinople, captured by Turks, 6
- Cooking, story of, 294-303; fire and, 294-298; how men learned art of, 298-300; roasting first stage in, 300; baking second stage, 300; boiling and steaming food, 300-301; three reasons for, 301-302; stoves for, 302-303; camp, 303
- Corn regions in United States, 175
- Cows, Egyptian models of, 155; tamed from wild animals, 156; chief supply of milk from, 156; inspection of, 336
- "Crispening" celery, 290
- Dairy industry, 159-160
- Dentine of tooth, 132
- Dentist, seeing the, 143
- Digestion, 127-128; in stomach, 145-146; in intestines, 147-148; best when mind is at ease and body rested, 148; diagram showing system of, 149; cheerfulness helps, 150, 151
- Digestive juices, 64
- Diphtheria, 101
- Drinking water, importance of, 66-67
- Drugs, use of, on doctor's advice, 78, 80, 252; alcohol a drug, 255; opium and other, 258-259; some worst enemies of man, 259
- Drunkenness, 252
- Ears, soreness in, due to lack of vitamin A, 92
- Eating, plenty of time should be allowed for, 148; keeping quiet after, 150; brain work to be avoided after, 151
- Eggs, contain calcium, 75, 230; contain phosphorus, 76, 230; yolk contains vitamins A and D, 116, 230; how first used, 222-223; yolk rich in iron, 230; white of, rich in protein, 230; facts to remember about, 231
- Eijkman, Dr. Christian, 97
- Enamel of tooth, 132
- Energy, makes everything go, 18-19, 21, 27; in body comes from food, 19, 42; makes you go, 27-36; measuring, of foods, 32-34; wasting, 35
- Epiglottis, 144, 149
- Escarole, leafy vegetable, 75
- Eskimos eat more fatty food than people in warm climates, 28-30, 46; in Baffin Land have perfect teeth, 135-136
- Esophagus, 144, 145, 149
- Ethylene gas used in process of preripening fruits, 289
- Evaporated milk, 292
- Exercise, as means of stimulating appetite, 252, 255; animals need, 349-350
- Experiment on rats as test of foods, 243-247
- Eye, lack of vitamin A and troubles with, 91, 92
- Fahrenheit thermometer, definition of, 40
- Fat, necessary food in cold climates, 30, 46; how formed in body, 42, 43-45; furnishes heat, 44; stored in body, 44, 54; acts as cushion for organs, 44; testing, for diet, 90; in milk, 160; in grains, 169; in nuts, 218; in meat, 229

Fertilizer necessary for good crops, 17-18

Fire, blessings of, 294-295; earliest methods of kindling, 295-296; modern method of making, 296, 298; how man learned to make, 297; safety matches for making, 298

Fish, and shellfish, 224-227; preserving with oil, 290

Fish hatchery, 228

Fish oils contain vitamin D, 230

Fishing industry, 226-227

Food, and health, 5, 17; why we need, 13-23; plants make own, 17; animals depend on plants for, 18; supplies energy, 19, 27-36, 42; and growth, 20, 35, 52-57; repairs body, 21-22, 52, 53; keeps body warm, 22-23, 27-30, 42; in winter body needs more fatty, 30; fuel-furnishing, 32, 42-48; measuring energy of, 32-34; importance of raw, 104-110; absorbed in small intestine, 147; milk nearly perfect, 160-161; testing, by experiment on rats, 243-247; highly seasoned, harmful and habit-forming, 264-265; preservation of, 280-292

Food models, 274

Fruit, more eaten in warmer climates, 29; contains calcium, 75; contains phosphorus, 76; importance of eating, 83, 200; story of, 196-210; flavor and food, 198-199; citrus, contains vitamins A, B, and C, 198; dried, 201, 202, 203-204, 285; keeping fresh by refrigeration, 201; some common

kinds of, 202-210; as food compared with candy, 236-240; preripening, 289

Fruit and vegetable store, 105

Fuel, two kinds of, 43; how burnt in body, 68

Fuel foods, 30, 32, 42-48, 68

Gall bladder, 149

Game is flesh of wild animals, 229

Gardening, 331-332

Gastric juice, 146

Glands, sweat, 65; salivary, 130

Goat's milk, 156, 157

Goiter, how caused, 79

Goldberger, Dr. Joseph, 101-102

Government, fights insect pests, 307, 312, 319, 320, 321, 339; how it helps, 334-340; inspects food and water supplies, 336-338, 339; inspects weights and measures, 338; maintains department of health, 338; supports agricultural colleges, 338-339; maintains agricultural department, 339; enforces pure food and drug laws, 339; maintains weather bureau, 340

Grain, story of, 168-177; raising, one of world's greatest industries, 169; nutrition in, 169; Egyptians measuring, 170; modern way of harvesting, 171; some important kinds of, 171-176

Grain foods incomplete, 171, 176, 177

Growth, and food, 20, 35; and sleep, 35; protein causes of body, 52-57; of plants, 326-327

Guide for meal-planning, 272-273; checking a lunch with, 271

- Health, studying about, 5, 7; and foods, 5, 17; broadcasting, 9, 13; a great treasure, 14, 16-17; gain or loss in weight and, 21
- Health Bulletin Board, 10, 11
- Health department of government, 338
- Health habits count in a game, 257
- Health notebook on foods, 10, 11-12
- Heart uses energy, 27
- Heat, produced by food, 22-23, 27-30, 42; supplied by sugars and starches, 43; fat furnishes, 44
- Height, and food, 20; recording, 25
- Hibernating animals and food, 23
- Hunger, what causes, 147
- Incisors, 131
- Insect enemies, the fight against, 306-322
- Inspection, need of, 335-336; of cows, milk, and milkers, 336, 337-338; of water supply, 336-337; of meat, 337, 339; of restaurants, 337; of weights and measures, 338
- Insurance against sickness, 86
- Intestinal juice, 147
- Intestines, 48, 64, 84; poisons in, cause illness, 84, 148; small and large, 147-148, 149; food absorbed in small intestine, 147
- Iodine, manufactured in thyroid gland, 79; food containing, 79-80, 189
- Iron, needed in blood, 76, 77, 81; foods containing, 77-78, 89, 170, 189, 230
- Irrigation, 60
- Joule, James Prescott, 33
- Laughing an aid to health, 151
- Leeuwenhoek, Anton van, 281
- Legumes, 191, 192
- Lewis-with-Harris Island, 137
- Life, average length of, 42
- Liver, contains iron, 78; bile from, 147; diagram showing, 149
- Luckner, Count, experience with scurvy, 239-240
- Lunch, an excellent, 85; choosing the right kind of, 267-276; a balanced meal or "A," 269; checking with guide for meal-planning, 271; well-planned, 275-276; hot-jar, 278-279
- Lunch box, a well-planned, 275-276
- Lunch card for balanced meal, 269
- Lunch room, cleanliness and attractiveness in school, 1-3; paying for, 4-5
- Lungs, use energy, 27; must be kept moist, 66; blood flows through, 68, 77; posture important to work of, 69; diseases of, due to lack of vitamin A, 92; diagram showing, 149
- MacMillan, Commander, 135
- Malaria, 101
- Manners at table, 370
- Maple sirup, 49-50
- Meal-planning, checking a lunch with guide for, 271; guide for, 272-273



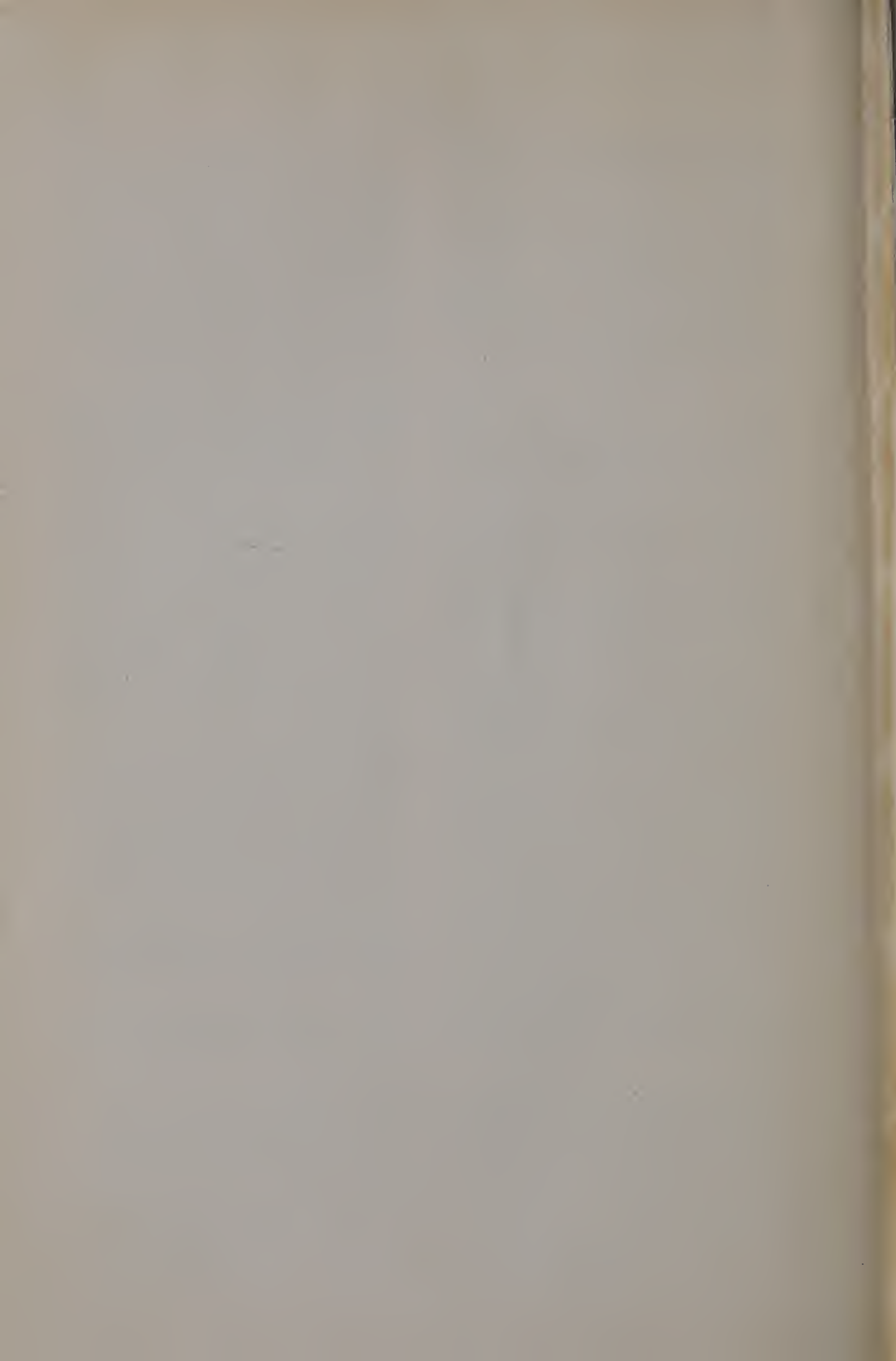
- Meals, should be taken at regular hours, 148; keeping quiet after, 150; brain work to be avoided after, 151
- Mealtime should be happiest time, 150
- Measures and weights, inspection of, 338
- Measuring energy of foods, 32-34
- Meat, how first used, 223; raising cattle, sheep, and hogs for, 224; rich in protein, 228; contains fat and minerals, 229; government inspects, 337
- Microorganisms, three kinds spoil food, 281
- Milk, rich in protein, 57; rich in calcium, 75, 134; contains phosphorus, 76, 134; low in iron, 78; contains vitamin A, 93, 161-162; rich in health-producing elements, 94; pasteurized, 110-111, 166, 291; story of, 154-163; an important food in ancient times, 155-156; from various animals, 156; most nearly perfect food, 160-161; contains all vitamins, 161-162; elixir of life, 162; keeping clean, 162, 163; facts about, 164; fuel value of, 165; preserving, 291-292; government inspects, 336, 337-338
- Milk powder, 292
- Minerals, body needs, 72-80; foods containing, 75, 76, 77, 188, 189, 199, 218. *See also* Calcium, Phosphorus, Iron, Potassium, Iodine
- Molars, 131
- Molds, spoil food, 281, 282-283; spores from, 283; destroying on grapes by modern process, 290
- Mouth, a healthy, 128-140
- Mumps, 131
- Muscles, proteins build, 52
- Nicotine. *See* Tobacco
- Nose, work of watery fluid in, 64; soreness in, due to lack of vitamin A, 92
- Nuts, the story of, 212-219; some common kinds of, 213-218; have very high food value, 218; rich in carbohydrates, proteins, fats, vitamins A and B, and minerals, 218; not easily digested, 218; recipes for use of, 220
- Overweight and calories, 42
- Oxygen, how used in body, 68, 77; given off by plants, 329
- Oyster industry, 225
- Pancreas, 147, 149
- Pancreatic juice, 147
- Pasteur, Louis, and preservation of food, 286
- Pasteurized milk, 110-111, 166, 291
- Patent medicines, 259
- Pellagra due to unbalanced diet, 101-102
- Pepper, has no food value, 264; irritates membrane of stomach, 264
- Perspiration, 63; cools body, 65-66
- Phosphorus, helps build and repair bones and teeth, 76, 115, 134; helps form body fluids, 76; foods containing, 76, 134, 170, 189, 218, 230

- Plants, make own food, 17, 327-330; and fertilizer, 17-18, 328; starches and sugars from, 43, 329; how they help, 324-332; grow by cell division, 326-327; are factories, 327-330; foundation of world's food supply, 328; give off oxygen, 329; sunshine necessary to, for making food, 329-330
- Potassium, in vegetables, 189; most important mineral of potatoes, 191
- Poultry, 229; proper care of, 248
- Preripening fruits, 289
- Preserving food, 280-292; sun-drying as means of, 285; by means of heat, 286; with salt, 286, 287; with sugar, 287; smoke as means of, 287; cold as means of, 287-289; modern processes of, in transportation, 289-290; with oil, 290; milk, 291-292
- Protein, repairs body and builds tissues, 52-53; foods rich in animal and vegetable, 52-53, 160; causes body to grow, 52-57; little, stored in body, 54; children need much, 54-55; origin of word, 57; in grains, 169; in food fruit, 199; in nuts, 218; meat rich in, 228; white of eggs rich in, 230; in plants, 330
- Protoplasm, 327
- Pulp cavity in tooth, 132
- Pylorus, 147, 149
- Rainfall in United States, 61, 62
- Raleigh, Sir Walter, and potatoes, 187
- Raw food, value of, 104-110
- Red corpuscles in blood, 76-77
- Refrigeration to preserve food, 288-289
- Rennet, 158
- Repairing body, food helps in, 21-22
- Rice, as food, 49, 96, 173; polished, lacks vitamin B, 97-99
- Rice areas of world, 98
- Rickets, due to lack of vitamin D, 114-115; sunshine as cure for, 116; among animals, 348
- St. Martin, Alexis, 145, 146
- Salads, 82-87; contain carbohydrates, vitamins, minerals, and water, 83, 86; supply cellulose to aid intestinal action, 84-86; make dinner attractive, 86; often contain fuel foods, 87
- Saliva, 48, 63-64, 130-131; changes starch into sugar, 64, 67, 131
- Salivary glands, sublingual, submaxillary, and parotid, 130, 149
- Salt, needed to flavor food, 263-264; harm results from using too much, 264; superstitions about, 265-266; as means of preserving food, 286, 287
- Sap of plants, 329
- School lantern, getting slides for, 10
- School lunch room, cleanliness and attractiveness in, 1-3; paying for, 4-5
- Scurvy, ocean travelers in past troubled with, 105-106; defenders of castles victims of, 106-107; arctic explorers fight,

- 108; Admiral Byrd's men not victims of, 108; due to lack of vitamin C, 104-110, 138; Count Luckner's experience with, 239-240
- Sea food supplied with needed iodine, 79
- Skin, dryness of, and results, 64; tanning of, as protection, 123
- Sleep, loss of, and waste of energy, 35; and growth, 35, 261; animals need rest and, 350
- Smallpox, 101
- Smoke as means of preserving food, 287
- Spices, as preservers of food, 6; and Columbus's discovery of America, 6, 8
- Spores from molds, 283
- Starch, body cannot use till turned to sugar, 47
- Starches, 43-48
- Stefansson, arctic explorer, 136-137; lived on meat, 229-230
- Stomach, 48, 149; Doctor Beaumont's study of digestion in, 145-146; needs rest, 148
- Stoves for cooking, history of, 302-303
- Sugar as means of preserving food, 287
- Sugar cane, 47, 49
- Sugars, 43-48
- Sun, worship of, 115, 116; seasons due to, 116, 118; Romans celebrate return of, 117, 118; Land of Midnight Sun, 118
- Sunburn, 122; tanning of skin protection against, 123
- Sun-drying as means of preserving food, 285
- Sunshine, and vitamin D, 73, 116; importance of, 118, 120; map showing amount of, in different states, 119; ultra-violet rays in, 121; enjoying, 122; points worth remembering about, 124-125; necessary to plants for making food, 329-330; necessary for animals, 349
- Sunshine Club, 124-125
- Table manners, 370
- Tanning of skin protects against too strong sunshine, 123
- Tartar on teeth, 140
- Tears, 63
- Teeth, need calcium, 74-75, 134; need phosphorus, 76, 134; good, necessary to digestion and health, 128-130; bad, spoil appearance, 130; incisor, canine, and molar, 131; first and permanent, 131, 132; right food necessary for growth and to prevent decay of, 134-135; Eskimos in Baffin Land have perfect, 135-136; how to brush, 137, 138-140; vitamin C and, 138; information to remember about, 141
- Testing food by experimenting on rats, 243-247
- Thyroid gland, manufactures a substance containing iodine, 79; and health, 79
- Tobacco, not a food, 256; contains poison called nicotine, 256; interferes with studies and athletics, 256-257; too much smoking of, bad for heart and nerves, 258; makes one a slave to habit, 258



- Tobacco habit, hard to break, 256, 258
- Tonics, 72, 78; to stimulate appetite, 252. *See also* Drugs
- Tooth, parts of, 132
- Toothache, 128, 133; no Eskimo word for, 136; Lewis-with-Harris Island and, 137
- Trachea, 144, 149
- Ultra-violet rays, 121, 123; window glass strains out, 121
- Underweight and calories, 42
- Vegetable and fruit store, 105
- Vegetables, rich in carbohydrates, 43, 187-188; contain calcium, 75, 189; contain phosphorus, 76, 189; in salads, 83-87; rich in vitamin B, 83; importance of eating, 85; protective food, 161, 189; eaten in large quantities, 182; valuable for roots, stems, leaves, seeds, and fruits, 182-187; where grown, 185; leafy, rich in vitamins A, B, and C, 188; contain small amount of protein and fat, 188; much water in, 188-189; contain iron, potassium, and iodine, 189; alkaline mineral salts in, 189-190; poor in fats, 192
- Vegetarian, man at first a, 222
- Vitosterol contains vitamin D, 73, 120
- Vitamins, D, 73, 74, 114-123; B, 83, 84, 89, 99-101; C, 89, 104-110; value of, 89-93; A, 91-93, 131; foods rich in A, 92, 176, 188, 193, 198, 218, 229, 230; foods rich in B, 100, 170, 174, 188, 198, 218, 229; G, 101; foods rich in C, 109, 186-187, 188, 191, 198, 229; foods rich in D, 116, 120, 122, 229, 230; milk contains all, 161-162
- Walnut trees, budding, 215
- Warmth of body, supplied by food, 22-23, 27-30, 42; furnished by sugars and starches, 43; fat supplies, 44
- Wastes of body, blood carries off, 64
- Water, importance of, to all life, 60-63; large part of body and of plants is, 63; some uses body makes of, 63-67; importance of drinking plenty of, 66-67; government looks after supply of, 336-337
- Weather bureau, 340
- Weight, gain or loss in, and health, 21, 42; recording, 25; increasing or decreasing amount of calories to secure proper, 42
- Weights and measures, inspection of, 338
- Wheat crop of world, 179
- Wheat regions in United States, 175
- World War, importance of food during, 48
- X rays, 145
- Yeasts and food, 281-282

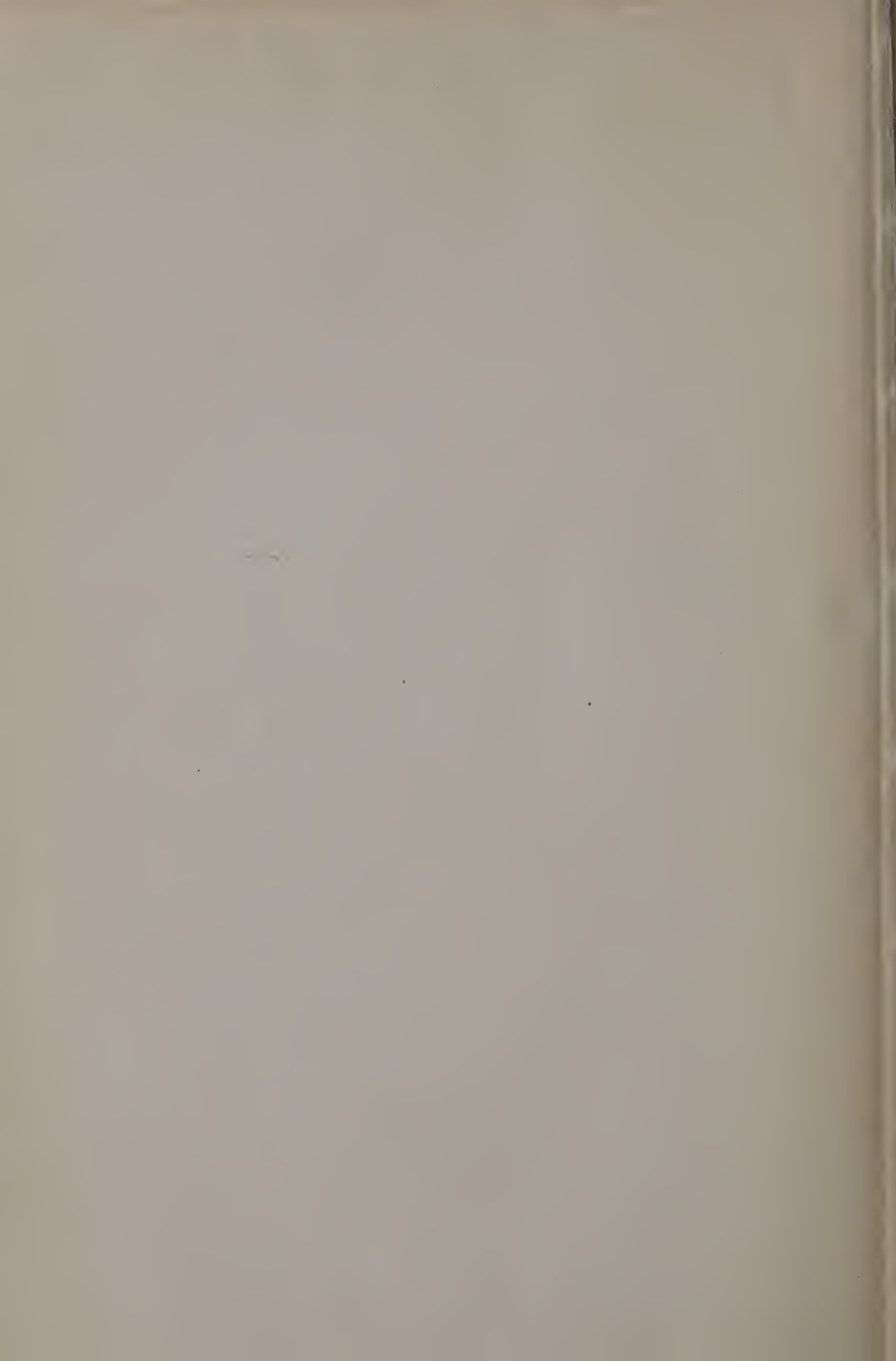


















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